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*Short Review***CORNEAL TOPOGRAPHIC TYPES, CORNEAL BIOMECHANICAL RESPONSE, HIGH ORDER ABERRATIONS AND CORNEAL DENSITOMETRY IN PELLUCID MARGINAL DEGENERATION**

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**1. Introduction**

Pellucid marginal degeneration (PMD) is an idiopathic, progressive, noninflammatory, ectatic corneal disease characterized by a peripheral crescent of inferior corneal thinning [1]. This ectatic disease mainly involves the inferior cornea, with an area

of thinning extending from the 4-o'clock to the 8-o'clock positions [2]. The term "pellucid" means clear and was first time used by Schlaeppli [3] to describe the corneal clarity with absence of lipid deposition, scarring or vascularization.

**2. Corneal Topographic Types**

The Classic topographic pattern of PMD is flattening of the vertical meridian above a crescentic band of thinning, with keratometric pattern of a marked "against-the-rule" astigmatism [4]. The other typical morphological patterns which are called the "butterfly" pattern are considered the most characteristic pattern in PMD due presence of the corneal protrusion below the area of thinning, with normal thickness

of the central cornea [5,6]. The last topographic pattern for PMD is that showing thinning towards the inferior part of the cornea with a peripheral band of thinning of the inferior cornea which is the hallmark signs of the disease. This thinning is characteristic and called "bell" sign. This pattern is the main type in advanced cases of PMD [7].

**3. Corneal Biomechanical Response in PMD**

Many studies have analyzed corneal biomechanical items in PMD using the Ocular Response Analyzer (ORA). A study was performed by Labiris et al [8] who evaluated the capacity of certain biomechanical indices in PMD. In a study of

Sedaghat MR et al, [9] they compared corneal hysteresis and corneal resistance factor in keratoconus, PMD, and normal eyes using the Ocular Response Analyzer, they concluded the results of the ORA were markedly different between PMD,

keratoconus, and normal eyes. Another study was conducted by Lenk et al. [10] they investigated the diagnostic capacity of corneal biomechanical response by using ORA and Corvis ST devices in

#### 4. High Order Aberrations in PMD

HOAs in cases of PMD have been evaluated in different studies. In a study of Kamiya K et al. [11] they reported the time changes in corneal wavefront aberrations in a patient with PMD; they found that coma-like aberration displayed a gradual, apparent increase with a 1.67-fold worsening during 11-year follow-up period while spherical-like aberration remained unchanged. Oie Y et al, [12] evaluated the characteristics of HOAs in eyes with pellucid marginal corneal degeneration,

#### 5. Corneal densitometry in PMD

The evaluation of corneal densitometry in patients with different corneal diseases has recently found to a crucial diagnostic tool [14,15]. Densitometric assessment provides measurable data of the corneal transparency at different depths and in different zones. In ectatic diseases, remarkable structural pathological changes occur in the corneal stroma, and both the structure and the arrangement of collagen

prospective clinical study, their results showed that ORA results showed that the Keratoconus Match Index was significantly lower in the PMD group than in the other control group.

they found that the coma aberrations was significantly lower in the PMD group than in the keratoconus group ( $P < .05$ ), while the spherical aberration was significantly higher in the PMD group than in the keratoconus group ( $P < .05$ ). Radhakrishnan, et al, [13] they studied aberrometry types in four patients diagnosed with corneal thinning disorders including a case of PMD, they concluded how aberrometry can be used to help in the differential diagnosis of patients with corneal thinning disorders.

fibrils are disrupted. SO, the corneal densitometric parameters increase [16,17]. In a study of M Koc et al. [18] they analyzed the topographic, densitometric properties of patients with PMD and inferior keratoconus in a retrospective cross-sectional study; they found that the densitometry values of PMD were significantly higher than those of the controls in all different zones.

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