



[www.aassjournal.com](http://www.aassjournal.com)

ISSN (Online): 2322 – 4479

***Short Communication***

Received: 13/09/2013

Accepted: 30/12/2013

## **Corneal Ectasis among Wrestlers: Report of Two Cases**

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### **ABSTRACT**

Report keratoconus in two patients with a long history of wrestling without any risk factor for corneal ectasia and reviewing the possible pathogenesis. To confirm suspicion of keratoconus, corneal topography was performed using scanning slit topography system and Orbscan. In two wrestlers with the complaint of visual loss in their eyes and IOP raising, corneal topography was performed and development of keratoconus (KCN) was detected. Athletes involved in sports with high strenuous exercises might need routine eye examination and also a baseline corneal topography. This may provide an earlier detection of KCN in this group of athletics.

**Key Words:** Wrestling, Cornealectasia, Intraocular Pressure, Keratoconus.

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## INTRODUCTION

Wrestling, a kind of martial art sport, is an Olympic game that is popular around the world. Although head or knee injuries are among the most common injuries in wrestling, ocular trauma also happens repeatedly. The sport is connected with repeated strenuous muscular efforts, forceful Valsalva maneuver, an inverted body position and repeated pushes to the eye. During all these conditions, significant intraocular pressure (IOP) elevation has been documented (1).

Cornea shape is affected by its elasticity, thickness and IOP (2). During normal conditions such as breathing and heart beating, IOP fluctuates within a fairly narrow diurnal range of about 5 mmHg (3). However, activities involving Valsalva maneuver, strenuous muscular effort, inverted body position and eye rubbing can lead to large IOP elevations with an associated increment in the distending force loading on the cornea and sclera (4).

It has also been shown that small external forces like eyelid pressure during near work can cause transient changes in corneal shape (5).

It is believed that following IOP rise, structural changes occur in the cornea, especially in the presence of predisposing factors for corneal ectasia like enzymatic deficiency. Moreover, eye rubbing and pushes induce keratocyte apoptosis that may weaken the corneal stromal stability. Combination of this IOP elevation and induced wound healing changes secondary to eye rubbing trauma may contribute to the development of keratoconus (6). Keratoconus is a progressive, non-inflammatory, ectatic disease of the cornea. The pathology is usually bilateral and can cause progressive corneal thinning and steepening ending in irregular astigmatism and scarring of the cornea (7).

As mentioned above, activities in wrestling are associated with significant IOP

rise and repeated blunt eye trauma. Herein, we report two patients with corneal ectasia who had unremarkable history of associated risk factors but had been wrestling for a relatively long period.

## REPORT of the CASE

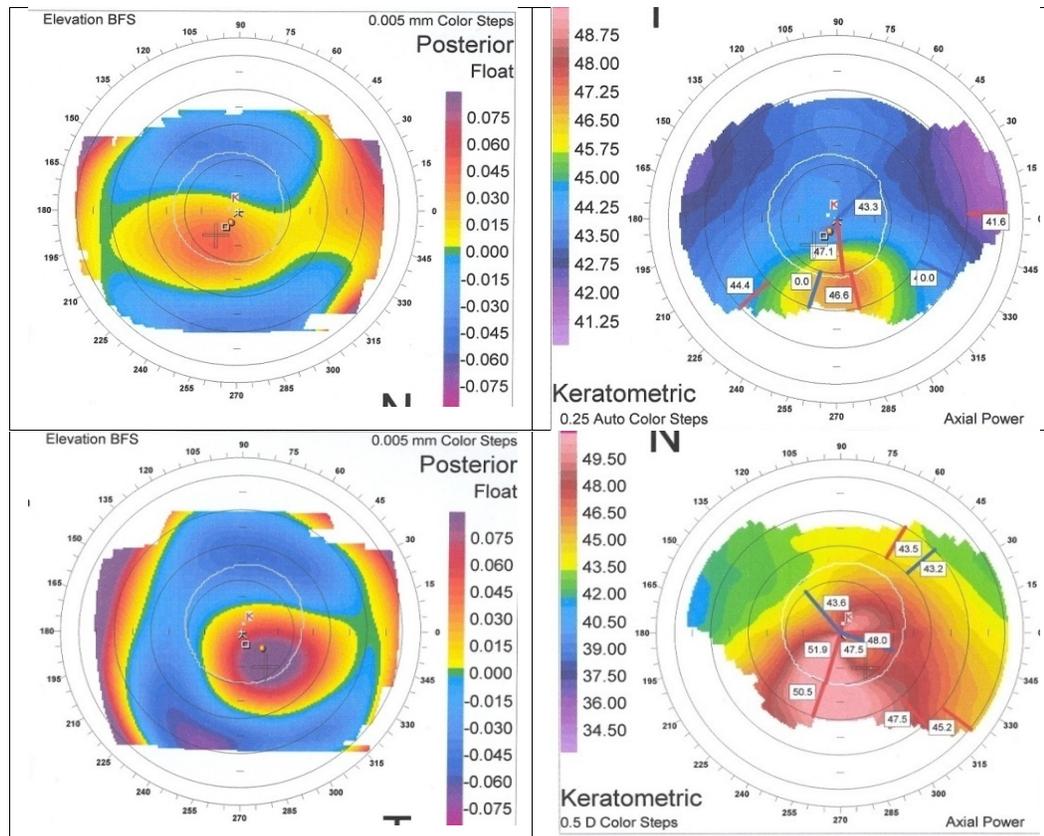
**Case 1.** A 30-year-old man presented with the chief complaint of gradual and progressive visual loss in his both eyes. The patient was healthy and had no history of previous ocular pathology, surgery and/or trauma. His family history was also unremarkable for corneal ectasia or keratoconus. The patient had been wrestling for more than 14 years. The patient noted that his visual acuity had reduced bilaterally since years ago.

At baseline examinations, best spectacle-corrected visual acuity (BSCVA) was 10/10 in his right eye (with +0.25–0.50×45o correction) and 9/10 in the left eye (with Plano –3.50×130o correction). Slit-lamp examination was unremarkable for both eyes. In the left eye, scissor motion was observed during obtaining retinal red reflex. There was no evidence of papillary or follicular lesions on both tarsal conjunctivae. Posterior ocular segment examination was normal bilaterally. Intraocular pressure readings with Goldman applanation tonometry were within normal range at 12 mmHg for both eyes.

To confirm suspicion of keratoconus, corneal topography was performed using scanning slit topography system (Orbscan II Topography System, Bausch & Lomb, USA). Provided maps showed an inferior steeping in the right eye and were completely compatible with keratoconus in the left eye (Figure 1). Results of anterior and posterior elevation maps were 20µm and 46µm in the right eye and 41µm and 99µm in the left eye, respectively. Corneal pachymetry maps showed thinnest points at

504 $\mu$ m and 474 $\mu$ m in the right and left eyes, respectively. Similarly, results of ultrasound pachymetry of central corneal thickness

revealed corneal thinning in the left eye (519 $\mu$ m right eye and 489 $\mu$ m left eye).



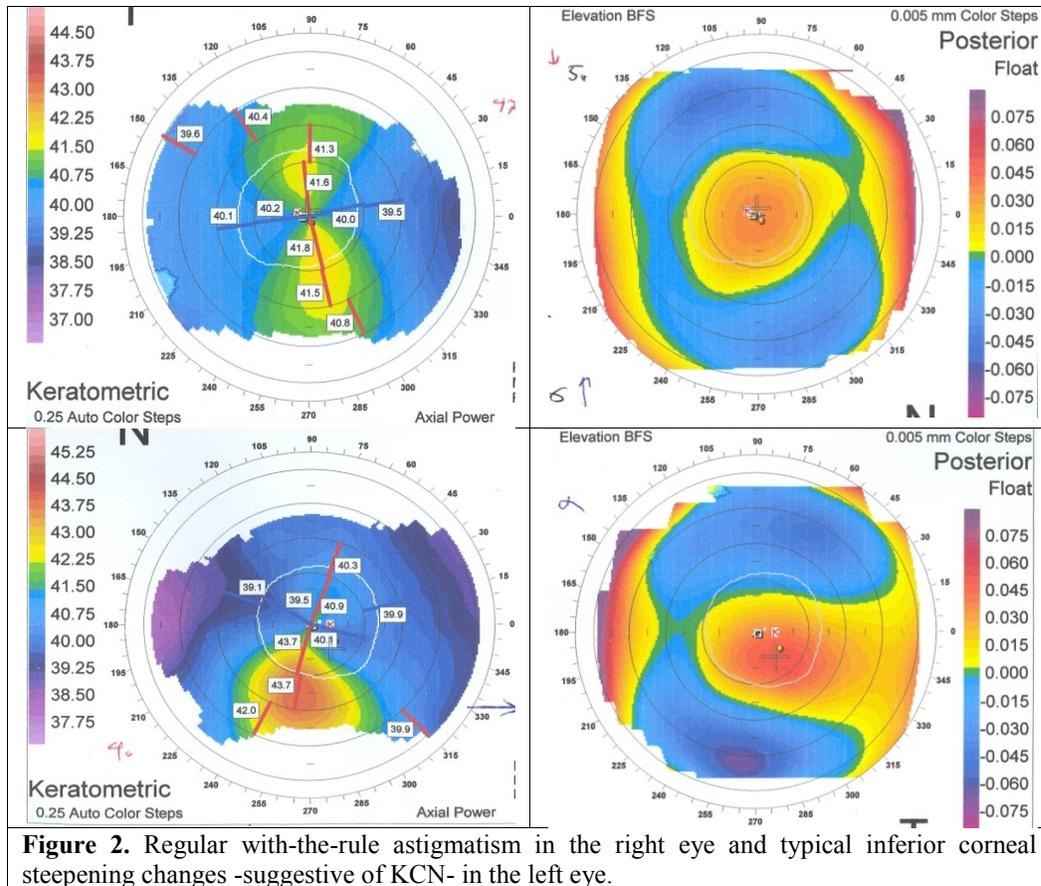
**Figure 1.** Inferior steepening in the right eye and were completely compatible with keratoconus in the left eye.

**Case 2.** A 35-year-old man presented (M.A.Z.) complaining of decreased vision in his both eyes. On questioning, he reported to have been wrestling for more than 20 years. His ocular and family history was unremarkable. He gave no history of vigorous habitual eye rubbing and was not diagnosed to have connective tissue disorder.

Slit-lamp examination of the anterior segment and fundoscopic examination of both eyes were normal. Intraocular pressure was 12 mmHg in both eyes. Manifest refraction was Plano-1.25 $\times$ 15o in the right eye and Plano-2.00 $\times$ 145oin the left eye. Irregularity in retinal light reflex was more

noticeable in the left eye. Patient's BSCVA was 10/10 in his both eyes. Measurement of central corneal thickness was 489 $\mu$ m and 476 $\mu$ m in the right and left eye, respectively. External ocular examinations were normal.

Orbscankeratometric maps revealed a regular with-the-rule astigmatism in the right eye and typical inferior corneal steepening changes -suggestive of KCN- in the left eye (Figure 2). Anterior elevation map showed 11 $\mu$ m and 18 $\mu$ m elevation in the right and left eyes, respectively. Posterior elevation map showed 36 $\mu$ m and 52 $\mu$ m elevation in the right and left eyes, respectively.



**Figure 2.** Regular with-the-rule astigmatism in the right eye and typical inferior corneal steepening changes -suggestive of KCN- in the left eye.

## DISCUSSION

Although it is generally believed that keratoconus has a genetic component, there are increasing data suggesting that the environment might also play a role in the development of the condition.

In fact, cornea is not mechanically an inert tissue. It has been shown that any stimuli such as altered hydration, hypoxia and subsequent injury or surgery can manifest clinically as immediate corneal shape changes, shape instability over time and increased sensitivity to shape changes.

In wrestling sport, severe body injuries, especially on the head and neck, and repeated blunt eye trauma are not absolutely uncommon (8). Moreover, Valsalva maneuver, strenuous muscular efforts and inverted body position, which all are common events during wrestling, could

induce significant IOP rise. It seems plausible to associate wrestling with occurrence of corneal ectasia in the possible mechanisms by which corneal ectasia associated with wrestling sport can be explained are repeated IOP-induced outward pushing of the cornea and release of interleukin by traumatized corneal epithelium which can follow the up-regulation of matrix metalloproteinase, collagenases, and complement within stromal keratocytes and dead keratocyte (8). Keratocyte apoptosis, myofibroblast differentiation, and corneal wound healing may lead to corneal ectasia (9).

It has been found that corneas with keratoconus have been exposed to a number of factors that can produce reactive oxygen species (free radicals). These include

ultraviolet light, atopy, mechanical eye rubbing, and poorly fitted contact lenses (8).

Both of our cases were male with a long history of wrestling. They did not have a history of any other ocular disease or a positive family history of KCN. The only presenting complaint was decreased vision in both cases, and KCN was confirmed in both patients on ophthalmic examination, and also on corneal topographic maps.

## CONCLUSION

Since there are no report on the association between the wrestling and KCN, We recommend all athletics involved in sports with high strenuous exercises undergo a routine eye examination and also a baseline corneal topography. This may provide screening in order for the earlier detection of KCN in this group of athletics.

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تازه‌های علوم کاربردی ورزش

دوره دوم، شماره دوم

صص ۲۸-۲۳، تابستان ۱۳۹۳

مقاله کوتاه

تاریخ دریافت: ۱۳۹۲/۰۶/۲۲

تاریخ پذیرش: ۱۳۹۲/۱۰/۰۹

## اکتازی قرنیه چشم در کشتی گیران: گزارش دو مورد

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### چکیده

هدف تحقیق حاضر گزارش دو مورد بیمار مبتلا به اکتازی قرنیه با سابقه طولانی ورزش کشتی و بررسی پاتوژنتیک بیماری در دو ورزشکار بود. دو مورد کشتی گیر با کاهش بینایی و افزایش فشار چشم دیده شد، جهت تشخیص بیماری، معاینه با اسلیت لمپ، توپوگرافی قرنیه و ارب اسکن انجام شد. شاخص‌های ارب اسکن وجود بیماری قوزقرنیه را تأکید کردند. توصیه می‌شود ورزشکارانی که در معرض خطر هستند تحت معاینات چشمی قرار گیرند. این معاینات ممکن است به تشخیص زودرس بیماری قوز قرنیه کمک کند.

**واژگان کلیدی:** کشتی، اکتازی قرنیه، فشار چشم، قوزقرنیه.

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