Microscopic Characteristics of Lower Eyelid Retractors in Koreans

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Purpose: To identify the microscopic characteristics of lower eyelid retractors in Korean individuals and to elucidate age-related changes in lower eyelid retractors.

Methods: Eighteen Korean lower eyelids from formalin-fixed cadavers were stained with Masson’s trichrome. Specimens were divided into two groups based on age at death (group A, ≤65 years; group B, >65 years), and the microscopic findings were analyzed and compared by light microscopy.

Results: The capsulopalpebral fascia (CPF) had distinct junctions and no fusion with orbital septum in 14 eyelids (77.8%). The CPF was fused with the orbital septum in only two eyelids (11.1%). Although not significant, the inferior tarsal muscle was closer to the tarsus in group A (1.24 ± 0.71 mm) than group B (2.14 ± 1.18 mm, p = 0.07), and the tarsal height tended to be longer in group B (4.71 ± 0.55 mm) than group A (4.16 ± 1.01 mm, p = 0.20). Tarsal fatty infiltration was more evident in group B.

Conclusions: The CPF was rarely fused with the orbital septum in our sample of Korean lower eyelids. Although we did not identify any remarkable age-related changes in lower eyelid structures, there was a tendency for the lower retractor to loosen from the tarsus and for increased fatty infiltration in the lower eyelids from elderly individuals.

Key Words: Koreans, Lower eyelid retractors, Microscopic structure

Several previous studies have examined the gross anatomical structure of Asian lower eyelids [1-5]. Doxanas and Anderson [1] identified differences between Asian and non-Asian lower eyelids based on gross dissection, and reported that lower eyelid retractor fusional location with the orbital septum was higher in Asians. These anatomical differences may be associated with differences in the incidence of common senile conditions, such as involutional entropion and ectropion. Lower lid entropion is much more common than ectropion in Asian individuals (11.4% vs. 1.5%, respectively), but ectropion is more common than entropion in non-Asians individuals (6.2% vs. 3.7%, respectively) [6,7]. Previously, Lim et al. [8] and Kakizaki et al. [9] used microscopy to study the fundamental differences between Asian and non-Asian lower eyelids. Lim et al. [8] demonstrated a lack of or limited fusion of capsulopalpebral fascia (CPF) with the orbital septum of Chinese subjects and Kakizaki et al. [9] reported a distinct junction between the orbital septum and the CPF of Japanese subjects.

In the present paper, we report our study of lower eyelids from Korean cadavers and compared our results with previously reported results for Chinese and Japanese subjects. In addition, we also determined the effects of aging on the microscopic changes in Korean lower eyelids.

Materials and Methods

Specimens from normal-appearing lower eyelids of 18 preserved Korean cadavers were prepared (7 right, 11 left). All cadavers were donated to the Medical College of Catholic University of Korea, and written consent and approvals were obtained before use. We followed the guidelines of the Declaration of Helsinki during the preparation of specimens.

All cadavers were fixed in 10% buffered formalin. We resected full-thickness lower eyelids at the mid-portion (10 mm horizontally, 30 mm vertically) and embedded these in liquid paraffin for several hours. The embedded specimens were sectioned into 6-μm sections with a microtome, and then...
stained with Masson’s trichrome. Sections were examined with light microscopy (fluorescence microscope Axioimager M1; Carl Zeiss, Heidenheim, Germany) and photographs were taken using a digital camera (Axiocam HRc, Carl Zeiss) affixed to the microscope.

Fig. 1. Microscopic view of cross section of Asian lower eyelid (Masson trichrome stain, ×40). T = tarsal plate; O = orbicularis; OF = orbital fat; IO = inferior oblique.

Results
Seven eyes were from men and 11 were from women. Eight eyes were classified into group A (mean age ± SD, 55.9 ± 7.4 years; range, 44 to 65 years) and 10 into group B (mean age ± SD, 73.6 ± 6.7 years; range, 67 to 83 years) (Table 1).

Fig. 1 shows microscopic cross-sections of the lower eyelids. In seven eyelids (38.9%), the orbital septum was indistinct and we were unable to identify. The other seven eyelids (38.9%) had distinct junctions between the orbital septum and CPF. The mean distance from the tarsus to the junction was 2.31 ± 1.27 mm (range, 0.81 to 4.22 mm) (Table 2). The CPF was fused with the orbital septum in only two eyelids (11.1%) and there was limited fusion in two other eyelids (11.1%) at the inferior tarsal border.

In 16 eyelids (89%), the CPF was attached to both surfaces of the inferior and posterior tarsal plates. One eyelid (5.5%) was only attached to the inferior tarsal surface, and one eyelid (5.5%) was only attached to the posterior tarsal surface. None of the eyelids had CPF disinsertion from the tarsus. Nine eyelids (three from group A, six from group B) exhibited CPF involvement of three surfaces of the tarsus: anterior, inferior, and posterior. There were no eyelids in which the CPF ran solely to the anterior tarsal surface, without involvement of other surfaces. In other words, when the CPF was attached to the anterior tarsal surface, it was always attached to the inferior and posterior tarsal surfaces for all 18 eyelids. CPF attachment to a specific tarsal surface seemed to have no relationship with age.

Table 3 shows the mean values of lower eyelid structures in the two groups. The mean tarsal height was 0.55 mm lon-