

**TITLE**

**GONIOSCOPIC, HISTOLOGIC AND MORPHOMETRIC EVALUATION OF THE NORMAL FELINE IRIDOCORNEAL ANGLE**

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**Purpose:** To evaluate the normal morphology of the irido-corneal angle (ICA) of the cat using gonioscopy (G), scanning electron microscopy (SEM) and optic microscopy (OM).

**Methods:** The study population consisted of 44 healthy cats (11 females and 33 males, aged 6 months to 6 years, mean age 14 months), with no evidence of ocular disease, for gonioscopy. (G) was performed using a Barkan lens for each of the 44 cats. Four parameters were subjectively evaluated: pectinate ligament (PL) fibers thickness (noted 1 for thin to 5 for large), density ("low", "mild", "high" or "varying"), orientation ("straight", "slanted" or "varying") and ciliary cleft (CC) width ("thin", "mild", "large"). Five other cats (2 females and 3 males, aged 2 months to 16 years, mean age ?) were used for SEM and OM. The left eye was removed after death (for non-ocular cause), and cut sagittally. After specific preparation, one half of the eye was examined by SEM and the other half by OM. Five parameters were evaluated by SEM with an image tool freeware (UTHSCSA, Image Tool for Windows V3.00) for each cat: PL fibers thickness, length, length of spaces between two consecutive PL fibers, uveal trabeculum (UT) fibers length, and Fontana spaces size; 10 measures were taken for each parameter for each cat. Four parameters were then evaluated by OM, for each cat: PL fibers length, CC depth, width, and global morphology of the ICA; one measure was taken for each parameter for each cat, except for the morphology which was a subjective evaluation.

**Results :** (G) analysis: the PL fibers thickness is low to moderate in 82% of cats, large in 14% of cats. In two cases, there were no visible PL. 18% cats had a low PL fibers density, 18% a mild density, 48% a high density and 11% a varying density. The orientation of the PL fibers was noted "varying" for 45% cats, "straight" for 36% and "slanted" for 14%. The ciliary cleft was always noted "large"; only one cat showed a "mild" CC.

SEM analysis: mean  $\pm$  SD PL fibers thickness ranged from  $7.5 \pm 6.2 \mu\text{m}$  (for the cat that had the thinnest LP fibers) to  $34.42 \pm 11.2 \mu\text{m}$  (for the one that had the thickest). Mean  $\pm$  SD PL fibers length ranged from  $237 \pm 65 \mu\text{m}$  to  $496 \pm 20 \mu\text{m}$ . Mean  $\pm$  SD spaces length between two consecutive PL fibers ranged from  $152 \pm 64 \mu\text{m}$  to  $266 \pm 27 \mu\text{m}$ . Two cats had no visible PL. Mean  $\pm$  SD UT fibers

thickness ranged from  $4.72 \pm 1.59 \mu\text{m}$  to  $15.02 \pm 8.68 \mu\text{m}$ . Mean  $\pm$  SD Fontana spaces length ranged from  $38.4 \pm 21.5 \mu\text{m}$  to  $82 \pm 30.2 \mu\text{m}$ .

OM analysis: the CC depth ranged from 783,04 to 1563,75  $\mu\text{m}$  (mean  $\pm$  SD  $1132,56 \pm 261,64 \mu\text{m}$ ). The CC width ranged from 177,18 to 480,76  $\mu\text{m}$  (mean  $\pm$  SD  $322,26 \pm 68,16 \mu\text{m}$ ). The PL fibers length ranged from 386,91 to 893,28  $\mu\text{m}$  (mean  $\pm$  SD  $707,4 \pm 170,08 \mu\text{m}$ ). The morphology of the ICA by OM was considered constant.

**Conclusions:** the global morphology of the normal feline ICA is constant. However, PL organisation varies widely among cats. Furthermore, the UT fibers thickness and the Fontana spaces both present large variations. The varying aspect of the PL fibers as regards their thickness, density and orientation should be considered as normal.