

Introduction

Phthisis bulbi represents an end-stage eye, which is characterized by variable degrees of atrophy and disorganization of intraocular contents, as well as reduction in size of the globe. Phthisis bulbi may result from trauma, chronic ocular disease (infectious, inflammatory, immune-mediated, neoplastic), or cyclodestructive procedures. Regardless of the initial trauma or disease process, there develops an imbalance of aqueous humor production and outflow, resulting in ocular hypotony and ultimately phthisis bulbi.

Much of the available human literature regarding phthisical eyes is focused on cosmesis and comfort through enucleation, evisceration, or the use of scleral shells. In veterinary medicine, literature on phthisis bulbi is limited and there is no consensus with regards to management of phthisical eyes. Moreover, to the authors' knowledge, there are no studies evaluating the comfort level, and more specifically, the corneal sensitivity, in phthisical eyes.

The cornea is one of the most densely innervated tissues in the body. Corneal nerves are important for protection of the globe given their afferent role in the corneal reflex. Appropriate corneal innervation is also essential for stimulation of tears, maintenance of epithelial integrity, and wound healing. Measurement of corneal sensitivity through esthesiometry offers an indirect assessment of corneal innervation. If corneal sensitivity is decreased, it is possible that corneal innervation itself is decreased; this has implications for the long-term management of phthisical eyes in our veterinary patients.

Methodology

Animals:

- Phthisical group - 14 dogs with unilateral or bilateral phthisis bulbi secondary to chronic ocular disease, trauma, or a cyclodestructive procedure were included. Dogs did not have any known endocrinopathies.
 - Mean age 10.8 years (range 8 months to 16 years)
 - 11 male, 3 female
 - Poodle or Poodle-mix (4), Dachshund (3), Shih Tzu (2), American Cocker Spaniel (1), Boston Terrier (1), Chihuahua-mix (1), Pit Bull-mix (1), and Yorkshire Terrier (1)
- Control group - 10 dogs with normal-sized globes and no known chronic ocular disease, no known history of a cyclodestructive procedure, no ocular changes aside from nuclear sclerosis or iris atrophy in their tested eye(s), and no known endocrinopathies were included.
 - Mean age 8.4 years (range 7 months to 13 years)
 - 5 male, 5 female
 - Poodle-mix (2), Chihuahua or Chihuahua-mix (2), unknown mixed-breed dogs (2), English Shepherd-mix (1), Beagle (1), Pit Bull-mix (1), and Schnauzer (1)

Corneal Touch Threshold

- Corneal touch threshold (CTT) = the pressure at which at least 3 out of 5 stimuli elicit a corneal blink reflex.
 - Measured using a Cochet-Bonnet esthesiometer, starting at a filament length of 40 mm
 - The length of the filament was decreased by 5 mm increments until 3 or more appropriate stimuli resulted in a corneal reflex blink. This length was then converted into CTT (g/mm^2) using the conversion table supplied by Luneau Technology Operations
 - If a reliable corneal reflex could not be elicited at the shortest measurable filament length of 5 mm (CTT of $15.9 \text{ g}/\text{mm}^2$), the CTT was recorded as $> 15.9 \text{ g}/\text{mm}^2$
 - Five regions of the cornea were tested when possible: central, nasal, dorsal, temporal, and ventral

Corneal Diameter

- Castroviejo calipers were used to measure the corneal diameter from the temporal to the nasal limbus in the eyes of all animals when possible

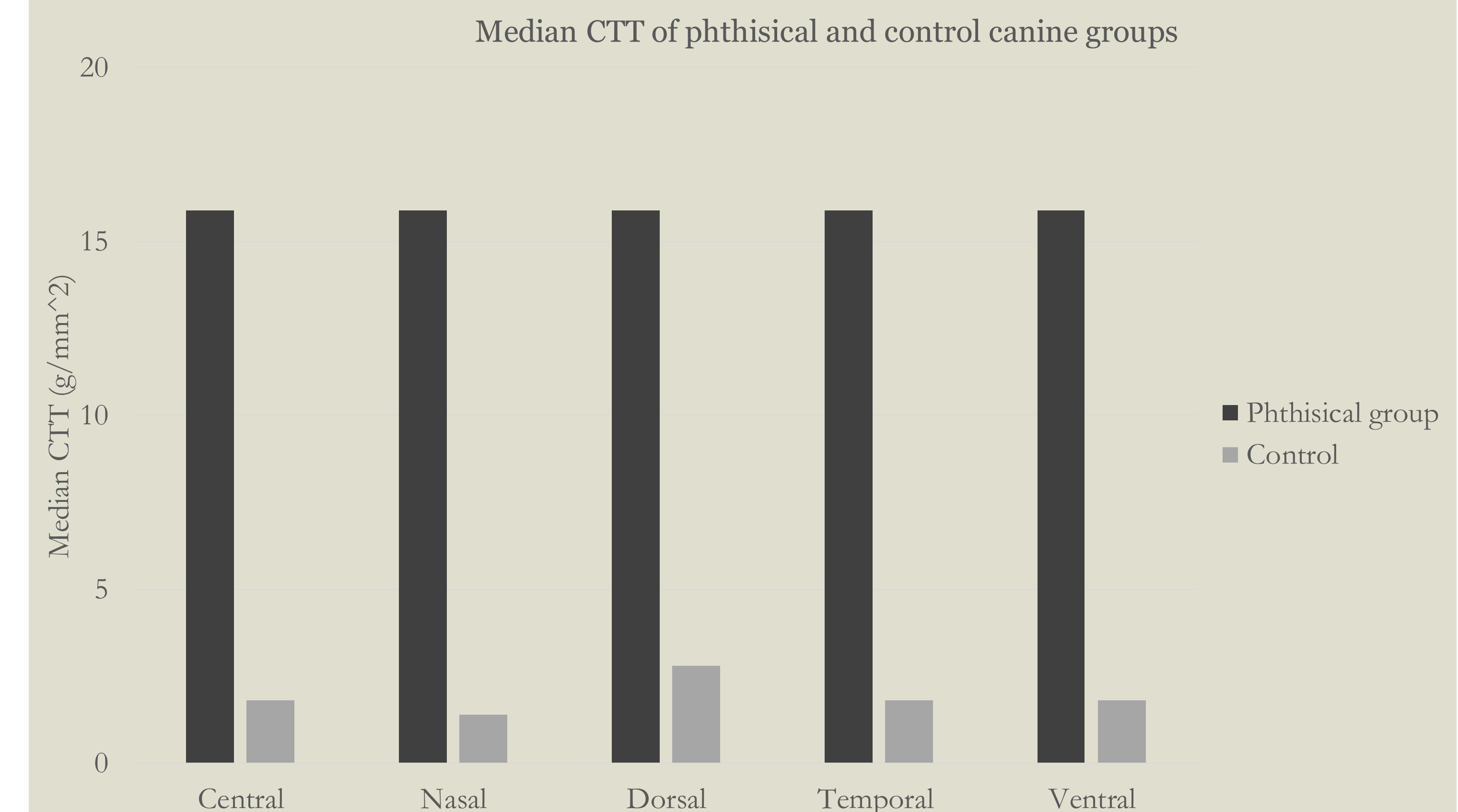
Preliminary data show that phthisical eyes in dogs tend to have decreased corneal sensitivity.



Enrollment of feline and additional canine subjects is ongoing.

Results

- A total of 17 phthisical globes and 12 normal-sized globes were tested.
- Preliminary data review shows phthisical eyes have higher median CTT values than those of normal-sized globes in all tested regions of the cornea.
- There is currently not enough data to examine trends between cause of phthisis and corneal sensitivity or duration of phthisis and corneal sensitivity.
- There is no apparent trend between corneal diameter and corneal sensitivity.



References available upon request.

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