The relationship between canine nasal length and second-hand smoke cotinine levels

Sierra Wilson
Murray State University

Terry Derting
Murray State University

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Introduction:
Second-hand smoke (SHS) has been associated with respiratory cancers in canines, with the predisposed locations determined by the cephalic ratio. The cephalic ratio is measured by dividing the head length by the head width (Fig. 1, 3, 4). Previous studies established the possible pre-disposed locations of SHS particulates according to the cephalic ratio of various dogs, where dolichocephalic breeds (long-nosed, Fig. 2) appear to retain more particulates in the nasal cavity while brachycephalic breeds (short-nosed, Fig. 2) retain more particulates in the lungs (Reif, 1992, 1998).

The exposure to SHS is frequently measured by analyzing urine or blood samples for the nicotine by-product cotinine. Cotinine is an easily measurable and commonly used because its half life is three times longer than nicotine itself. A previous study established a positive correlation between SHS exposure and the cephalic ratio via urine sampling (Bertone-Johnson, 2014). The drawback to urine is the potential difficulty of collecting the sample. Also, urine is filtered through the body, whereas saliva is in direct contact with the dog’s environment therefore it is not hindered by the body’s filtration system.

Methods:
- Owners were recruited at a local community dog wash
- Owners were surveyed about dog’s exposure to smoking
- Cephalic ratio was measured (Figs. 3 - 4)
- Saliva samples were obtained (Fig. 5)
- Body condition score was recorded (Fig. 6)

Results:

**Cotinine Concentration by Group**

<table>
<thead>
<tr>
<th>Group</th>
<th>Cotinine (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smokers</td>
<td>14.5 ± 2.3</td>
</tr>
<tr>
<td>Control</td>
<td>10.2 ± 1.7</td>
</tr>
</tbody>
</table>

**Result 1.** The mean (± 1 S.E.) cotinine concentration of dogs not exposed to smoke was much lower than for dogs exposed to smoke (t-test, P < 0.01; N = 35).

**Fig. 1.** Cephalic ratio determined by head length / head width

**Fig. 2.** Examples of dog breeds with a large and a small cephalic ratio.

**Fig. 4.** Measurement of head width

**Fig. 5.** Obtaining saliva sample

**Fig. 6.** Body condition score chart

**Fig. 3.** Measurement of head length

**Fig. 5.** Cephalic ratio

**Introduction:**
Dolichocephalic

Cephalic ratio ≤ 65%

Brachycephalic

Cephalic ratio > 65%

Conclusions:
- Saliva samples may be a useful alternative to samples that can be more difficult to obtain (e.g., urine) when evaluating exposure to SHS.
- The finding of higher cotinine concentration in brachycephalic dogs may be useful for informing potential dog owners of possible future illnesses and diagnoses.

Works Cited:

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