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**Conference or Workshop Item**

**Title:** Canine skull morphology: what we know so far

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**Version:** Presented version

[http://nectar.northampton.ac.uk/9306/](http://nectar.northampton.ac.uk/9306/)
Canine Skull Morphology; What We Know So Far

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2nd/DOS Dr. Robin Crockett
Why this topic?

• Dogs have the greatest phenotypic diversity of all (sub)species
  – 1.5kg up to 90kg
• Dogs are very popular: UK population is estimated at 8.5million (PFMA, 2016)
• Currently a lot of scientific interest into the impact of skull shape on health of dogs (Koch et al., 2003; Knowler et al., 2014; McGreevy et al., 2013)
• Skull shape categories need refining (Georgevsky et al., 2014)
Current Research and Key Findings

• Georgevsky et al. (2014)
  – Observed correlation between cephalic index and intelligence

• Cephalic index is not sufficiently dynamic

• Discrepancy between cephalic index and breed categorisation (Andrews et al., 2015)
  – Positive correlation when height included

Figure 1. Correlation between the cephalic index and the height : length ratio of canine skulls (n=107) (Andrews et al., 2015)
## Current Skull Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Brachycephalic</th>
<th>Mesocephalic</th>
<th>Dolicocephalic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameters</strong></td>
<td>Length &lt; width</td>
<td>Length = Width</td>
<td>Length &gt; Width</td>
</tr>
<tr>
<td><strong>Proportion</strong></td>
<td>&gt; 80%</td>
<td>75-80%</td>
<td>&lt; 75%</td>
</tr>
</tbody>
</table>

• Based on human morphology of skulls
• BUT dogs have a rostrum in addition to their skull

Images from publicdomain.net
Measuring Categories

• Currently 14 different indices in use
• Most common is Cephalic Index
• Need for a more dynamic categorisation

Image: (Georgevsky et al., 2014)
Measurement Points

Image: Georgevsky et al., (2014)
Variation within categories

Images from publicdomain.net
The aim is to investigate relationships between skull shape and dental health and manducation methods.

The Objectives are:

- To establish clear definitions of the skull categories for the domestic dog using a wider range of dimensions.
- To gather data on the incidence of dental problems across a range of skull shapes and sizes.
- To determine whether manducation patterns vary between dogs of different classifications when consuming the same food type.
My Methods for Phase 1

• Sample of 600 pedigree dogs (minimum)

• 20 breeds selected to focus on (The Kennel Club, 2015)

• n=15 males and females for each breed

• Measurements taken of each set of points
Breed Selection

- Chihuahua (smooth)
- Miniature Schnauzer
- Pug
- Shih Tzu
- Staffordshire Bull Terrier
- West Highland White
- Whippet
- Border Collie
- Flat Coated Retriever
- Saluki
- Beagle
- Dachshund (mini smooth)
- GSD
- Golden Retriever
- Cocker Spaniel
- English Springer Spaniel
- Boxer
- Border Terrier
- Bulldog
- Shar pei
Aims for Later Phases

• Observe for clusters of data
  – Confirm categories

• Compare categories to prevalence of periodontal disease and eating methods
  – Retrospective dental record analysis
  – Creation of a chew analysis tool
Dog Recruitment

• Currently seeking contacts with dogs who would be willing to take part
• Either I measure their dog or they send images to analyse

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Questions?
References


