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Setting a limit for conformational exaggerations in dog breeds to halt the slide towards even more extreme conformations

Position Statement of the UK Brachycephalic Working Group

October 8th, 2020

Key points:

- **There are significant potential health and welfare issues associated with exaggerated physical conformations within dog breeds, including brachycephaly.**
- **The BWG is particularly concerned about selection for further exaggeration within the current brachycephalic population of UK dogs and the introduction of new breed variants with a range of extreme exaggerated features e.g. teacup types, exotic bully, toadlines.**
- **The current levels of conformational exaggeration in the breeds recognised by the UK Kennel Club provide a limit beyond which future conformational change in dogs must not go.**
- **Further exaggeration beyond the current extent of exaggeration of brachycephalic breeds or the development of new brachycephalic breed types with even more extreme conformation, is unacceptable.**
- **The BWG calls upon breeders, prospective owners and show judges for urgent action to reduce exaggeration of existing breeds.**
- **'Stop and think before buying a flat-faced dog'.**

Background

The UK Brachycephalic Working Group (BWG) recognises that significant potential health and welfare problems can result from continued selection towards progressively more exaggerated physical characteristics (conformations) within dog breeds.

Conformational exaggeration describes a physical, detrimental feature in a dog that has been deliberately selected by mankind to deviate progressively from the typical shapes of wild canids that were the precursors of the modern domestic dog. Degrees of exaggeration can be scored from mild to severe, depending on how far this progression has gone.

We are extremely concerned about recent moves to introduce new breed variants with extreme exaggerations to the UK e.g. exotic bullies, toadlines, by either importation of new breed types or by selecting for more extreme conformations within current UK dogs.

This position paper focuses on extreme exaggeration within brachycephalic (flat-faced) dogs but the BWG proposes that the general principles laid out here also apply to over-selection for exaggerated features in all types of dogs.

The objectives of this position statement are

1. To outline some of the most common physical conformations that result in compromised health and welfare in dogs, particularly brachycephalic breeds and to highlight the legislation that requires breeders to act responsibly (Canine and Feline Sector Group, 2020).

2. To provide evidence that conformational exaggerations typically associated with brachycephaly, carry health and welfare risks for some dogs with brachycephaly.

3. To encourage breeders to move towards more moderate conformations in the dogs that they breeds and to encourage prospective owners to consider carefully purchasing decisions before buying a brachycephalic dog.

Effect of brachycephaly and extreme conformation on the health and welfare of dogs.

Studies on a focused selection of brachycephalic breeds have provided substantial evidence that many of the current conformational exaggerations associated with brachycephaly are associated with health and welfare issues in some dogs of other breeds that show brachycephaly (Lists 1 & 2). Given this broad evidence base on the welfare issues associated with the current brachycephalic breeds, it is alarming that new variants of dogs with even more extreme versions of these current problematic exaggerations are being introduced to, or bred in, the UK. These dogs with super-extreme conformations are sometimes called hyperbrachycephalics or hypertypes. These changes include exaggeration of size (e.g. miniaturisation of existing breeds), proportion (e.g. exaggeration of height:body length and limb angulation) and external features such as skin (increased skin folding) and coat volume. Specific examples include “exotic bully”, “toadline” and “micro-American” “bully” types, “

Big Rope“ “teacup” miniatures of several breeds, and extremely long-haired brachycephalic dogs. Given the known health issues associated with existing levels of exaggeration in the UK dog population, BWG recognises that dogs with even more extreme versions of current exaggerations are likely to suffer even higher levels of compromised health and welfare.

Particular concerns of the BWG include the “Exotic Bully” dogs such as “Toadline” and “Micro-Bully” dogs, as well as other types of “micro-“ and “teacup-” brachycephalic dogs. The Exotic bully contains genetic material from several different breeds, but most prominently the American Bully and the English Bulldog.

Note that the American Bully is a distinct type from the more widely recognised American Bulldog. Although the American Bully has been recognised by the Orthopaedic Foundation for Animals (OFA 2020b), there is limited health data on the breed. There is even less epidemiological data on disorders impacting welfare of the far more exaggerated Exotic Bully or many of the other most exaggerated breed-types at present. Hence, much of the evidence on the following conditions shown to impact health and welfare comes from comparison with more widely recognised breeds including the American Bully and the more popular “traditional” brachycephalic breeds such as the French Bulldog, Pug and Bulldog. For the Exotic Bully, advice to breeders and standards under development form part of the evidence and are quoted here in italics.

What actions are required?

Based on the substantial evidence that is available, the BWG believe that the current levels of conformational exaggeration in the breeds recognised by the UK Kennel Club provide a limit beyond which future conformational change in dogs must not go. We are concerned that without urgent action, then further exaggeration will continue to accrue in current UK dogs and new breed variants will increase in number in the UK. We are therefore calling for three specific actions:

1. **Owners**: BWG urges all potential dog owners to

    a. ‘Stop and think before buying a flat-faced dog’. Consider whether owning a flat-faced dog is the right thing to do or whether another breed would be more appropriate for you to own.

    b. If you still decide to purchase a flat-faced breed, only purchase a puppy directly from a reputable breeder and refuse to purchase a puppy whose parents show severe conformational exaggeration (Canine and Feline Sector Group, 2020). Do not purchase a puppy without using the Puppy Contract (The Puppy Contract, 2020).

2. **Breeders**: BWG urges all breeders to breed selectively towards less exaggerated types of brachycephalic dogs, based on the broad evidence base showing the severe health risks associated with extreme or exaggerated conformations.

3. **Show judges**: BWG urges all show judges to promote dogs with minimal exaggerations ahead of those with more severe exaggerations, when awarding prizes.

List 1. Conformational exaggerations of brachycephalic dog breeds with *strong evidence* health and welfare issues (Canine and Feline Sector Group, 2020)

- Narrowed nostrils
- Excessively wide and short head
- Excessively thick neck
- Thick skin folds, particularly nasal
- Protruding eyes (corneal exposure)
- Spinal Curvature (vertebral malformations/ scoliosis/ kyphosis)
- Inverted or screw tails
- Entropion and ectropion of eyelids

List 2. Conformational exaggerations of brachycephalic dog breeds with *likely* health and welfare issues (Canine and Feline Sector Group, 2020)

- Abnormal leg conformation including very short legs or 'Queen Anne' curved forelimbs
- Excessively long hair coat
- Excessively short back

APPENDIX

Evidence supporting this position

Head size and shape

US Bully Registry (US Bully Registry 2020): proposed breed standard. The Exotic Bully breed…. is a "head and front breed": chest should be wide to match blocky head type. …. HEAD Medium length, deep through, broad skull, very pronounced cheek muscles, 90 degree skull stop, and high set ears... MUZZLE Short rounded on upper side or squared to fall away abruptly below eyes. Eye shape would be round to oval, low down in skull and set far apart.

MUZZLE Short rounded on upper side or squared to fall away abruptly below eyes.

Puppies with oversized heads, and wide shoulders with reduced hind quarters are associated with high levels of dystocia and Caesarean sections. This is seen in many brachycephalic breeds and breeds with a small pelvis, including miniature breeds. Bulldogs, French Bulldogs, Boston Terriers, Pugs, and Chihuahua have very high rates of dystocia (Bergstrom *et al.* 2006; Evans and Adams 2010; D.G. O'Neill *et al.* 2017; Dobak *et al.* 2018; O'Neill *et al.* 2019a)

Some studies have suggested that more widely set eyes are associated with a greater prevalence and severity of brachycephalic obstructive airway syndrome (BOAS) in individual bulldogs and French bulldogs with shorter and wider skulls (Liu *et al.* 2017) or with shorter muzzles in relation to cranial length. Similarly wider set eyes have been informally associated with severity of BOAS in the pug and French bulldog in some older texts, although only non-significant trends in this direction were seen by Liu et al. (2017).

Skin folds.

Excessive skin is a problem in some breeds, from the Shar-pei, the Neopolitan Mastiff and the Bloodhound to the Bulldog, pug and to a lesser extent the French Bulldog and Pekingese. Skin folds are warm moist potential breeding ground for bacteria and yeasts causing pyoderma. Around 9% of bulldogs were treated by a veterinarian for pyoderma during the year 2013 in a VetCompass study (O'Neill *et al.* 2019b). Pyoderma may also occur as a result of skin infection around screw tails, with a quite different conformational aetiology as detailed below.

A thick skin fold over the short muzzle and nose (a nasal roll, sometimes called a rope) is typical of one type of bulldog. This trait is also present in some French bulldogs and Pugs. Skin folds at the sides of the nose may also close or partially close the nares. All of these features show associations with presence of clinically significant BOAS (Wright et al., Cambridge University group, unpublished data). Some individuals in Bully breeds show facial and other skin folds.

Skin folds around the eyes may obstruct the visual axis. These fold or folds over the nose are also associated with corneal damage as outlined below. A multiple breed study has reported a link between the presence of brachycephaly and the likelihood of corneal ulceration, which is compounded by the presence of a nasal roll (Packer *et al.* 2015a).

Entropion and ectropion.

Excess skin around the eyes can lead to eyelids rolling into the eye (entropion) causing corneal damage through scratching of the corneal surface by hairs or eyelashes). Ectropion (eyelids rolling outward) leads to drying and inflammation of the conjunctiva and allows eversion of the nictitans gland that produces part of the tear film, aggravating conjunctival damage. Because of their loose skin, 89% of Neopolitan Mastiffs and 48% of Bulldogs in US testing have abnormalities with their eyelids (OFA 2020a). Corneal damage caused by skin folds, entropion and ectropion may all be aggravated in long-haired breeds where distichiasis and contact of hair with conjuctiva and cornea is more likely. Thus even modestly brachycephalic breeds such as the Maltese dog, Shih-Tzu, Bichon-Frise and Chow-Chow can have problems with corneal damage (Christmas 1992; Guandalini *et al.* 2016; Maini *et al.* 2019)

Corneal exposure.

In addition to the eye problems caused by excessive skin, unusual eye positioning and shape in brachycephalic dogs can give rise to corneal damage. Severely proptotic (protruding) eyes are most common in Pekingese, Griffon Bruxellois, Pugs and in miniature brachycephalic dogs (Ali and Mostafa 2019; Pe'er *et al.* 2020) but may be variably present in French Bulldogs and other brachycephalic breeds. In most cases, it appears that depth of the orbit in the skull of these animals is insufficient for the size of the eye. The forward position of the eye, as well as its protrusion, may make full closure of the eyelids difficult or impossible, causing dry eye (keratoconjunctivitis sicca) and leaving eyes exposed to traumatic injury, as well as being at greater risk from injury by frequent abrasion from hairs and eyelashes.

Frequent injuries to the cornea take the form of pigmentary keratitis, pannus (vascularisation) and ultimately ulceration. Corneal ulceration has been reported as a painful disorder in dogs (D. O'Neill *et al.* 2017). Eye testing recorded by OFA shows that in the period 2015-2019, 52% of Pugs tested had damage to at least one cornea, along with 19% of Pekingese, 8% of Shih-Tzu, $% of Bulldogs (OFA 2020a). A study of Pugs in the UK reports even higher figures for corneal damage (92% of pugs with pigmentary keratitis (Maini *et al.* 2019). A study of dogs registered at primary veterinary practices showed that in a single year, 5.4% of registered pugs were treated for corneal ulcers. Overall brachycephalic breeds were 11 times more likely to have corneal ulcers than crossbred dogs (D. O'Neill *et al.* 2017).

Narrowed nostrils

Narrowing of the nostrils (stenotic nares) has been considered as a feature obstructing air flow in brachycephalic dogs for many decades (Wykes 1991). Using whole body barometric plethysmography, the University of Cambridge group showed that narrowed nostrils contribute considerably to abnormalities in resting respiration, as well as poor performance in respiratory functional testing after exercise (Liu *et al.* 2016).

Fluid dynamic studies using computer models based on a small number of CT scans predicted that the rostral third of the nasal passage in bulldogs contributes a large part of the resistance to airflow through the nasal passage. The median pressure difference between nose and larynx was >18 times higher in brachycephalic than other breeds, whilst median measured resistance to airflow across the same interval was >9 times higher in the same breed comparisons (Hostnik *et al.* 2017; Fernández-Parra *et al.* 2019).

Exaggerated neck thickness

Exotic Bulldog: advice on the proposed breed standard. The neck is always broad and short, next to its head and significantly wide shoulders (Barking Royalty 2019).

Exaggerated neck thickness is seen in several brachycephalic breeds and may be associated with supporting an over-large head. The ratio of neck girth/chest girth has been shown in two studies to be associated with brachycephalic obstructive airway syndrome in several breeds (Packer *et al.* 2015b; Liu *et al.* 2017).

Hemivertebrae/kyphosis/ scoliosis (curvature of the spine, including "roach back")

Hemivertebrae and other vertebral malformations are present in several brachycephalic breeds at high rates. These malformations may cause an abrupt bend or for hemivertebrae often a kink in the vertebral column (Ryan *et al.* 2017; Bertram *et al.* 2019; Ryan *et al.* 2019; Wyatt *et al.* 2019). Their presence is thought to be associated with the selective broadening of the muzzle in French bulldogs and Bulldogs, as the causative gene in these breeds is similar to the "Dishevelled" gene mutations which cause a similar facial type and vertebral defects (Robinow syndrome) in humans (Soman and Lingappa 2015). Abnormal vertebrae generate a screw tail or kinked tail in these and other breeds (see below).

Unfortunately hemivertebrae, when present, are rarely confined to the tail; their presence in the cervical and thoracico-lumbar vertebrae cause malformations of the back which may well account for the roach back (kyphosis in the mid back) seen in some brachycephalic dogs. The genetic causation of hemivertebrae in pugs is different from that in Bulldogs and French Bulldog breeds, where mutations in the DVL2 are believed to cause kinked and severely shortened tails as well as being associated with brachycephaly in GWAS (Bannasch *et al.* 2010; Mansour *et al.* 2018). The mutation in DVL2 in bulldogs and French bulldogs is fixed and is close to fixed in the Boston terrier. The spinal and tail abnormalities reflect the phenotypes when this gene is mutated in mice (Mouse Genome Informatics 2020). In bulldogs and French bulldogs, severe neurological consequences are less common than in pugs (but still sometimes present). Commonly in pugs, malformed thoracic vertebrae can be associated with nerve damage leading to hind limb paresis or paralysis and incontinence. A number of other abnormalities have been described associated with thoracic spinal abnormalities, including association between kyphosis of the thoracic spine and lateral heart displacement, as well as kyphosis of the thoracic spine and tracheal hypoplasia (Komsta *et al.* 2019).

Many exotic bully's have the reverse condition, a pronounced lordosis, associated with the longer length of hind than forelimbs. Skeletal changes and consequences of this are currently undocumented. The *US Bully Registry proposed breed standard for the back includes "A slight fall off behind the shoulders to the beginning of the back, which is the lowest part of the entire topline is acceptable*" (US Bully Registry 2020)

Inverted or screw tails

Inverted or screw tails may be a consequence of vertebral malformations. Inverted or screw tails are associated with severe dermatological problems and can obstruct the anus with severe consequences.

The *US Bully Registry Exotic Bully proposed breed standard: "TAIL: Short to medium in comparison to size, low set, tapering to a fine point ending at the rear hock are preferred. A docked tail is acceptable and is preferred over a tail with kinks and knots. (EXCEPTION: Exotic Bullies that are shown or that reside in countries where docking of tails is either next to impossible or illegal; i.e. most European countries. In this regard a tail with a kink and/or knot will not have the fault held against them in the show ring)" (US Bully Registry 2020).*

Elbow dysplasia/front legs (including "Queen Anne Legs")

The *US Bully Registry Exotic Bully proposed breed standard:" slightly bowed front legs, large and round bones, pasterns upright are preferred… A slight turning outwards of the feet up to 15 degrees is accepted. (Disqualification only if out-turn is greater than 90 degrees (!)" (US Bully Registry 2020)).*

American Bully: "The forelegs are strong and muscular with a slight turn to the forearm. The elbows are set close or just slightly away from the body .The upper arm…joins [the shoulder blade] at an apparent right angle" (AKC 2020).

The Exotic Bully has short and apparently dyschondroplastic forelimbs with the upper limb not carried directly under the shoulder blade, and often carried at an angle projecting sideways from the body. The American bully generally has much less abnormal forelimbs than the Exotic. Nonetheless, in the OFA register of elbow dysplasia, the American Bully shows the second highest breed prevalence of dysplastic elbows after the Chow Chow breed. (American Bully has 41.5% of animals in the register considered elbow dysplastic.) Exotic Bully data is not held in this register. Furthermore the Pug and the Bulldog are ranked 4th and 5th of 139 breeds with more than 100 evaluations on the database. The majority of breeds show less (often much less) than 5% of individuals with dysplastic evaluations (OFA 2020a).

In the UK, the BVA/KC Elbow scheme has scored only 6 pugs, 8 bulldogs and 6 French bulldogs, with 5/6 pugs, 5/8 bulldogs and 2/6 French bulldogs ruled as having dysplastic elbows (BVA 2020a). This suggests that the scheme is being avoided by UK owners of these breeds.

Patellar luxation

Patellar luxation is a particular problem in miniature breeds such as Pomeranian, Chihuahua and Toy Poodle. Such breeds are well known for suffering early medial and later lateral luxations (O'Neill *et al.* 2016; Nilsson *et al.* 2018; Boge *et al.* 2019). OFA statistics show that of 142 breeds with at least 50 evaluations, the Pomeranian has the highest prevalence of patellar luxation (as in the UK) with 34.1% dysplastic. This breed is followed in prevalence by a number of very small terrier breeds and the Japanese Chin. Interestingly in this context, the American bulldog, French bulldog and Pug are all within the top 30 for prevalence of patellar luxations, although the Bulldog is only in 38th place, and the American Bully 63rd. Again statistics on Exotic Bullys and Teacup breeds are not available (OFA 2020a).

Hip dysplasia/hind legs

Dysplastic hips are associated with abnormal carriage of the hind limb in many breeds, and can lead on to osteoarthritis. Larger brachycephalic breeds have high levels of hip dysplasia. Few extreme brachycephalic dogs have been tested in the BVA/KC hip scheme: 31 bulldogs, 43 French bulldogs and 67 pugs, over the last 15 years compared with (for example) 1379 Dogue de Bordeaux or 376 American bulldogs (BVA 2020b). Over the period the Bulldog has the second highest mean hip score, with the pug 7th and French bulldog 21st out of 195 breeds. (High scores reflect poorer hips). The OFA website has pug (72%), bulldog (71%) and Olde English bulldog (66%) as 1st, 2nd and 3rd worst affected breeds in terms of %age of hips dysplastic (respectively 861, 1074 and 143 dogs scored). Once again the French bulldog is 21st (31% dysplastic, 2347 scored). In this scheme 134 American Bully dogs have been scored with 14% dysplastic, putting them 13th in rank of 193 breeds scored (BVA 2020b).

Unfortunately, Exotic bullies are not yet ranked by any hip score registry. Videos suggest that many of these dogs are only able to walk with considerable difficulty (Dawgg Flix Films 2016; NCGOTTILINE 2016).

Excessive hair.

In addition to the potential for corneal damage already mentioned, excessive hair contributes to overheating in BOAS-prone brachycephalic dogs. These dogs can already overheat because of the inadequate airflow over reduced and tangled turbinates, that prevents cooling through evaporation. Larger breeds also have less surface area per unit of bodyweight, so are especially prone. Overheating can kill, and the association with long hair is shown well in two new VetCompass studies (Hall *et al.* 2020b; Hall *et al.* 2020a). Acting together, excessive hair along with shortened skulls and excessive wrinkling may all disrupt the signalling communication between dogs, both by making the understanding of signals by a recipient dog difficult, and by disrupting vision and thus the reception of signals in the hairy and/or brachycephalic individual (Kerswell *et al.* 2010).

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