Brachycephalic problems of pugs relevant to animal welfare

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Abstract

Excessive breeding for brachycephaly (fore-shortened muzzle) has led to increasing problems in pugs related to brachycephalic airway syndrome (BAS). Consequently, the German Pug Club (Deutscher Mopsclub eV; DMC) established a stress test in 2009 that must be passed for breeding and requires normalised heart and respiratory rates 15 min after having covered a distance of 1 km. In this study, 42 pugs underwent the stress test under standardised conditions. Taking into account that this exercise should not be too physically demanding for any healthy dog, the results were surprising: 14 of the pugs failed, ie a failure rate of 33.3%. In addition to the stress test, the pugs were assessed according to their heart and respiratory rates at rest, which we predicted would be associated with BAS, and in this test, 21 out of 42 pugs failed. Thus, 50.0% of the pugs were in a severely compromised physical condition. A further group of seven retropugs, ie a crossbreed of pugs with a slightly longer muzzle, was included in the study to compare brachycephalic problems. All of the retropugs passed the test, even when respiratory and heart rates at rest were considered. However, the findings may not be transferable to all retropugs because of the small sample size, so further research is needed. In summary, this study has enabled the development of recommendations for future implementation of stress tests.

Keywords: animal welfare, brachycephalic airway syndrome, physical exercise, pugs, retropugs, stress test

Introduction

Short-muzzled dog breeds have become popular again. However, excessive breeding for brachycephaly affects the entire upper respiratory tract. Stenotic nares and elongated soft palate are the primary malformations narrowing the airways (Harvey 1982; Aron & Crowe 1985; Wykes 1991; Koch et al 2003; Riecks et al 2007). The nasal cavity is too small to allow normal post-natal growth of nasal conchae. This results in so-called aberrant conchae obstructing the nasal passage and the choanae (Oechtering et al 2007). Increased inspiratory effort is necessary to ensure adequate ventilation. This increased effort leads to excessive negative pressure breathing, which can cause secondary damage, such as tissue oedema, as well as everted tonsils and laryngeal saccules. Additionally, laryngeal or tracheal collapse has been observed during disease progression. Recent examinations have identified further obstructions responsible for dyspnoea. For example, the nasal vestibules are narrowed by nasal alae that are too long. Additionally, the soft palate is not only overlong but also thickened. The tongue is too long and too thick (Oechtering 2010). A study reported that 35 out of 40 brachycephalic dogs suffered from bronchial stenoses, and the pug was the most affected breed (De Lorenzi et al 2009). A further study suggested that brachycephalic dogs were prone to lower PaO2, higher PaCO2, and hypertension (Hoareau et al 2012).

Brachycephalic airway syndrome (BAS) is a combination of upper respiratory tract disorders in predisposed breeds (Oechtering et al 2007). According to the severity of the stenotic changes, the signs and symptoms include stertorous breathing, loud snoring, coughing, suffocation, syncope and problems when eating (Lorinson et al 2003). The primary clinical symptom is an inspiratory stridor (Koch et al 2003). Furthermore, these dogs exhibit exercise intolerance and signs of dyspnoea. Severe cases can result in cyanosis and collapse caused by hypoxia. Pugs are additionally very prone to hyperthermia because thermoregulation is limited by the short length of their noses (Oechtering 2010). The severity of symptoms related to BAS seems to have increased considerably over the last few years. Interviews with brachycephalic dog owners demonstrated that more than half of the dogs suffered from breathing disorders during sleep, causing 24% of the dogs to attempt to sleep in a sitting position and 36% to have already collapsed as a result of dyspnoea (Oechtering 2013). Moreover, many affected dogs develop signs of disease during their first three years of life (Oechtering et al 2007). The lack of percep-