

Short Communication

Trance-like syndrome in bull terriers

M. Lowrie, P. M. Smith, T. De Keuster, L. Garosi

TRANCE-like syndrome (TLS) in bull terriers (BTs) has long been recognised by breeders and owners, with many considering them typical of the breed. Episodes consist of a hypokinetic gait with compulsive pacing of variable duration, during which the dog remains aware of its surroundings. Our purpose was to establish the phenotype of TLS in dogs exhibiting an episodic hypokinetic gait and to report results of diagnostic procedures in affected dogs.

Purebred BTs were recruited via the veterinary media, internet (BT forums and Facebook) and using the UK Kennel Club's Bio-Acquisition Research Collaboration scheme. Diagnosis was confirmed by owner interview and video footage demonstrating a hypokinetic gait (see online supplementary video), following which owners completed a questionnaire. Dogs were required to have exhibited TLS for at least one year. A second cohort of unaffected BTs was also recruited, with owners completing a questionnaire with specific questions regarding TLS omitted. Categorical variables were described as fractions. Comparisons were performed using chi-squared test with a P value of <0.05 considered significant.

Details of 281 BTs were collected, comprising 84 dogs with TLS and 197 control dogs. The median age of the 84 BTs at trance onset was four years three months (range 6 months–8 years 3 months); 41 were female (26/41 neutered) and 43 were male (23/43 neutered). All dogs exhibited a slow-motion gait with aimless pacing that was repetitive, topographically invariant (i.e. not relating to a specific region of the nervous system) and apparently purposeless. In 51 of 84 dogs, pacing was interspersed with periods of standing and staring into space, often lasting a similar length of time. Dogs responded to their owners during trances, though 22 of 84 owners reported a degree of impaired awareness. All dogs were normal between episodes of trancing and would recover immediately following an episode.

Daily trancing occurred in one in five BTs with TLS (up to five times in total) and 25 per cent BTs with TLS would trance every few days. All dogs had at least one episode every two months, with 90 per cent trancing at least once a week. Episodes typically lasted between 30 seconds and 30 minutes; 72 of 84

owners felt they could interrupt a trance by a loud sound such as a name-call. They were most commonly associated with dogs walking underneath stationary objects, including vegetation and household objects (68/84), but were exceptionally rare away from the home environment, even if similar objects were encountered.

Concurrent abnormal behaviour patterns were reported in 60 of 84 dogs, including tail-chasing (45/84), sudden onset aggression/raging syndrome (15/84), fly-catching (4/84) and licking/chewing/biting (3/84). Similar abnormal behaviours were reported in 47 of 197 control dogs but those with TLS were more likely to have these abnormalities ($\chi^2=55.07$, $df=1$, $P=0.0001$).

Twenty-nine dogs underwent general clinical and neurological examinations, all of which were normal. Ancillary diagnostic tests were performed in 53 dogs, including routine haematology and biochemistry (53/53), bile acid stimulation testing (35/53), urinalysis (31/53), blood pressure measurement (23/53) and radiography of the spine, thorax, abdomen or limbs (39/53). No pertinent abnormalities were detected. MRI of the brain ($n=22$) and CT ($n=1$) revealed no structural abnormalities, cerebrospinal fluid analysis ($n=22$) was normal and neoplasia antibody ($n=19$) titres were unremarkable. Concurrent diseases in 13 dogs included atopic dermatitis (9), cardiomyopathy (2), recurrent cystitis (1) and hypothyroidism (1).

Although episode frequency and/or duration increased in the first six months in 56 dogs, there was no further progression or remission. Treatment was attempted in 52 dogs, using oral phenobarbital or potassium bromide, but had no appreciable effect.

TLS could represent a canine compulsive disorder (CCD) or a neurological condition such as epilepsy (Dodman and others 1996). In people, obsessive-compulsive disorders are behavioural conditions in which anxiety arises through an obsession with a particular theme, such as cleanliness. Sufferers try to eliminate the anxiety by performing particular rituals, such as repeatedly washing the hands or repeatedly checking whether a door is locked.

CCDs are recognised and are derived from normal behaviours, such as grooming (e.g. acral lick dermatitis), ingestion (e.g. flank and blanket sucking) and predation (e.g. tail chasing and fly-catching). They are considered to arise from anxiety and/or inadequate environmental stimulation (Moon-Fanelli and others 2011) and, with time, occur outside the original context without obvious triggers (Hewson and Luescher 1996). Structural brain abnormalities have been described in dogs with CCDs, which resemble those described in people with obsessive-compulsive disorders (Ogata and others 2013); these are beyond the resolution of conventional diagnostic MRI. A genetic predisposition is suggested by the association of the cadherin-2 locus with CCD (Dodman and others 2010). Interestingly, this polymorphism has been linked with autism in people, a condition in which repetitive behaviours are common (Wang and others 2009). A hypokinetic gait could represent misdirected predation. Some owners have dogs that simply stare into space, without pacing, though the authors excluded this cohort, as such a non-specific finding could occur in dogs with various ailments. Whether TLS truly reflects a compulsive behaviour is difficult to prove but the demonstration that tail chasing and aggression were more common in TLS suggests that affected dogs at least have a predisposition to such dysfunctional behaviour. A similar association was suggested in a previous study of tail chasing in BTs (Moon-Fanelli and others 2011).

The veterinary literature states that to be labelled a true CCD, the repetitive behaviour should occur in the absence of any primary medical condition. However, extensive medical work-up

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was not performed for abnormal repetitive behaviours before conclusions were drawn about their aetiology. For example, fly catching was for many years ascribed to a partial seizure or obsessive-compulsive disorder but recently was found to be a clinical sign secondary to gastrointestinal disease (Frank and others 2008). Therefore, TLS would appear to be most likely a CCD given the investigations performed in the 84 presented dogs.

An alternative possibility is that TLS represents complex partial seizures, in which consciousness is altered but not lost (Berendt and others 2004). BTs with a variety of CCDs were shown to have epileptiform activity on electroencephalographic recordings (Dodman and others 1996). However, electroencephalographic abnormalities do not automatically imply a seizure disorder. For example, epileptiform discharges are frequently recorded in patients with autism despite the absence of seizures (Chez and others 2006). Moreover, partial seizures are usually brief in duration (<10 minutes), whereas trancing episodes could last longer, with immediate recovery and no post-ictal signs (Licht and others 2002, Berendt and others 2004). The absence of autonomic signs and lack of response to conventional antiepileptic medication also argues against seizure activity.

It was not appropriate to calculate prevalence because the method of recruitment of questionnaire respondents meant that there was likely to be a significant ascertainment bias with owners of dogs prone to having trances being more likely to respond.

TLS in BTs represents a disorder of episodic slow-motion gait, decreased responsiveness and intermittent staring into space. Episodes appear to be triggered by walking under particular objects in the home environment and, once recognised, increase in frequency before stabilising. Although antiepileptic medication has no effect, neither dogs nor owners are unduly distressed by their occurrence.

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