

Idiopathic Head Tremor in English Bulldogs

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ABSTRACT: Idiopathic head tremor (IHT) syndrome is a recognized but poorly characterized movement disorder in English bulldogs (EBs). The data analyzed were collected via a detailed online questionnaire and video recordings. Thirty-eight percent of the population demonstrated IHT. The first presentation was early in life. There was no sex or neutered status predisposition. The condition disappeared with time in 50% of the cases. The direction of the head movement was vertical or horizontal. The number of episodes per day and the duration of the episodes were greatly variable. The

majority of episodes occurred at rest. Most of the episodes were unpredictable. And there was no alteration of the mental status for most dogs during the episodes. Stress has been reported as a suspected trigger factor. IHT in EBs can be considered an idiopathic paroxysmal movement disorder. © 2013 International Parkinson and Movement Disorder Society

Key Words: movement disorder; dog; bulldog; head tremor

Canine idiopathic head tremor (IHT) is a poorly understood breed-specific tremor condition of the head affecting Doberman pinschers¹ and anecdotally English bulldogs (EBs) and boxers.² A recent study in Doberman pinschers characterized IHT as a sudden onset of vertical and/or horizontal rhythmic head movements lasting from a few seconds to several hours.¹ However, there remains a lack of data about this condition in other dog breeds. The aim of the current study was to phenotypically characterize IHT in the EB to identify potential risk factors and to compare this breed-specific canine disorder with similar canine and human movement disorders.

Additional Supporting Information may be found in the online version of this article.

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Materials and Methods

This study was approved by the Ethics and Welfare Committee of the Royal Veterinary College, University of London, England (approval number URN 201100039H). EB owners and breeders were contacted and invited to complete a detailed questionnaire available online and to provide video recordings of the episodes and pedigree information of their dogs. Some owners were contacted by e-mail or telephone for data verification. This questionnaire was designed by the primary author and a board-certified veterinary neurologist (H.A.V.). Video recordings of the episodes were also requested and analyzed by reviewing the events in slow motion. It was decided that each responder could enter only 1 affected dog. The Mann-Whitney *U* test or Fisher's exact test was used to compare groups. A $P < 0.05$ was considered statistically significant.

Results

Study Population

Two hundred thirty-four EB owners participated in the study. Eighty-nine EBs had reported episodes of

IHT and were considered the affected patient population. This group consisted of 41 male (54%; 95% CI, 44%-64%) and 48 female (46%; 95% CI, 36%-56%) dogs between 5 months and 12 years of age (median, 4 years) and weighing between 12 and 40 kg (median, 26 kg). Forty-one of the 89 dogs (46%; 95% CI, 36%-56%) were neutered, whereas 48 (54%; 95% CI, 44%-64%) were sexually intact animals. The remaining 145 dogs had not demonstrated signs suggestive of IHT at the time of the questionnaire and served as the control group for the affected animal population. This last group consisted of 62 females (43%; 95% CI, 35%-51%) and 83 males (57%; 95% CI, 49%-65%). Eighty-four dogs (58%; 95% CI, 55%-66%) were sexually intact, and 61 (42%; 95% CI, 34%-50%) were neutered. They were aged between 5 months and 12 years (median, 3 years) and weighed between 8 and 55 kg (median, 26 kg). There was no significant difference in sex ($P = 0.10$) or neuter status ($P = 0.58$) between clinically affected and control dogs.

Age of Onset

The reported age of onset ranged from 6 months to 9 years (median, 2 years; 0.5-9 years), which was younger than the age of the control group (median, 3 years; 0.5-12 years; $P = 0.01$). Fifty-three dogs (60%; 95% CI, 50%-70%) had their first reported IHT episode before they were 3 years old, with 2 years the most common reported age of onset (27% of dogs; 95% CI, 18%-36%).

Occurrence of Events

Episodes of IHT occurred predominantly at rest ($n = 68$ dogs; 76%; 95% CI, 67%-85%) and during sleep ($n = 37$; 42%; 95% CI, 32%-52%). Fewer than 10% of owners noticed the condition during exercise ($n = 8$; 9.0%; 95% CI, 3%-15%). Most owners did not think there was a link between a specific period in the day and the occurrence of IHT episodes ($n = 55$, 62%; 95% CI, 52%-72%) or a seasonal influence ($n = 79$; 89%; 95% CI, 83%-96%). For most dogs, no specific stimuli were identified before an episode of IHT occurred ($n = 77$; 87%; 95% CI, 81%-95%), but some owners mentioned stressful events ($n = 6$; 7%; 95% CI, 2%-12%), exercise ($n = 3$, 3%; 95% CI, 0%-7%), and whelping ($n = 3$; 3%; 95% CI, 0%-7%) as a possible trigger. Intact females did not seem to demonstrate IHT episodes more often around their estrus cycle, but could demonstrate more IHT episodes when they had a litter (12 of 29 intact female dogs with a litter, 41%; 95% CI, 23%-59%).

Characterization of Episode

Almost none of the owners were able to predict the occurrence of IHT episodes ($n = 85$; 96%; 95% CI,

78%-92%). Most affected dogs were considered normal before ($n = 59$; 66%; 95% CI, 56%-76%) and immediately after ($n = 62$; 70%; 95% CI, 61%-80%) the IHT episode. In some affected dogs, behavioral changes were observed before an IHT episode occurred (alone or combined: sleepiness [$n = 18$; 20%], staring [$n = 13$; 15%], disorientation [$n = 7$; 8%], agitated [$n = 1$; 1%], fearful [$n = 1$; 1%], sniffing [$n = 3$; 3%]). None of the owners reported any behavioral change after the episode. During the episodes of IHT, body posture stayed normal in 86% of dogs ($n = 76$; 95% CI, 82%-96%), but a more floppy ($n = 3$, 3%; 95% CI, 0%-7%) or stiff ($n = 10$, 11%; 95% CI, 5%-18%) posture was also reported. None of the dogs showed autonomic clinical signs prior, during, or after the event. Affected dogs were reported to be conscious and aware of their surroundings during IHT episodes. Although not included in the questionnaire, several owners also commented that distractions or treats were generally sufficient to alter or stop the episodes.

Video recordings of 7 affected dogs in their home environment were assessed in slow motion. The frequency of the tremors was between 4.88 and 6.17 Hz (median, 5.75 Hz) with variable amplitudes. The latter varied between episodes. Occasionally, the IHT episodes stopped for a few seconds before continuing with a similar frequency. The general direction was either horizontal ($n = 2$) or vertical ($n = 5$). Duration ranged from a few seconds to 3 hours, and the frequency of observed IHT episodes varied from 1 to 11 episodes a day (median, 2.0 episodes/day; Table 1).

Clinical Progression

The frequency of occurrence of the episodes was reported to be extremely variable and appeared random (ie, "daily," "weekly," "several times per week," "every 2 months," "clusters every 6 months," "once a year"). The tremors disappeared spontaneously in 44 affected dogs (49%; 95% CI, 39%-59%). None of the dogs were euthanized by the owners because of IHT. Ninety-nine percent ($n = 88$) of the affected population was not on any treatment. One dog received calcium supplements.

Discussion

This is the first study evaluating the phenomenology and the clinical course of IHT in EBs. The latter

TABLE 1. Phenomenology of idiopathic head tremors in English bulldogs

Parameters	Results
Direction	Vertical/horizontal
Frequency range	4.8-6.2 Hz (median, 5.75 Hz)
Duration	Seconds to 3 hours
Episodes per day	1-11 (median, 2)

TABLE 2. Comparison of movement characteristics of idiopathic head tremors (IHTs) in English bulldogs (EBs) and Doberman pinschers (DPs) with some human movement disorders

Movement disorder	Essential tremor	Dystonic tremor	Cerebellar tremor	Paroxysmal dyskinesia	Clonus	IHT in EBs	IHT in DPs
Localization	Hands, head, vocal cords			Head: not reported	Generally involves extremities	Head	Head
Head localization	Yes (infrequent) ^a	Yes	Yes	N/R	Yes	Yes (only)	Yes ^c
Movement driven	No	No	Yes	No	No	No	
Paroxysmal	No	No	No	Yes	No	Yes	Yes
Frequency (Hz)	4-8	3-12	2-4	4-7	N/A	4-7	5-9

N/R, not reported; N/A, not applicable.

^aInclusion of isolated head tremor in essential tremor is controversial and a notion of duration (3-5 years) is included in order to distinguish from other tremor syndromes.

^bIn general, head tremor is associated with mild arm tremor, and isolated head tremor is very rare.¹⁸⁻²⁰

^cCoexistent cervical dystonia reported.

appears to be an idiopathic, paroxysmal, benign movement disorder characterized by episodic head tremors with an early onset in life, with spontaneous resolution in nearly half of the population. No risk or trigger factors were identified in this study.

The affected dogs remained responsive and conscious during the episodes. None of the dogs had autonomic clinical signs or displayed altered behavior after the episodes. None of the included patients received anti-epileptic medication. Although no drug studies have been published, it has been suggested that these treatments do not alter the clinical course of EBs with IHT.¹⁻⁴ It seems unlikely that IHT in EBs represents a seizure disorder. Most episodes occurred at rest during a standing position and continued during walking, suggesting that those tremors are not only postural but also rest tremors when referring to their phenomenology.⁵ The frequency of the head tremors was of medium range (4-7 Hz) when compared with human tremor frequency references (Table 2).⁵ The tremors were not reported during target-directed movements or to change in amplitude during the pursuit of a goal (intention tremor). The latter and the presence of rest tremor suggest that the condition is unlikely to represent a cerebellar disturbance.⁵ Although no specific triggers for tremor episodes were identified in this study, stressful environmental situations were occasionally mentioned to be present at the time of head tremor.

Although episodic disorders with head movements have previously been reported in dogs,⁶⁻¹⁴ a similar head tremor syndrome has only been anecdotally reported in boxers,² and a recent study provided a detailed characterization of the clinical presentation and pedigree analysis of IHT in Doberman pinschers.¹ IHT in Doberman pinschers and EBs appears to be similar (Table 2). We, however, did not find a bimodal age of onset distribution, as reported in Doberman pinschers.

In human movement disorders, tremors localized only to the head are rare, but head tremors are not uncommonly part of certain tremor types.¹⁵ IHTs in

EBs share some similarities with essential tremors, focal dystonic tremors, clonus, and paroxysmal dyskinesia in people (Table 2). It is clear that although IHT in EBs shares similarities with several human disorders, the exact nature of this spontaneously occurring movement disorder in a specific dog breed is currently unknown. Some authors have proposed that IHT in dogs is a postural repetitive myoclonus involving stretch reflex mechanism.⁴ IHT occurred with various head positions and also when the head was rested (Video 2). Recent genetic research in Cavalier King Charles spaniels suffering from episodic falling syndrome has highlighted the importance of identifying the genetic basis of movement disorder in animals to improve the characterization of these syndromes.^{16,17}

In summary, although no identical presentation could be identified in people, the description and further study of IHT in EBs may bring some valuable information toward the understanding of some aspects of human tremor syndromes. Therefore, a clear phenotypic characterization of IHT as presented in this study is an essential first step for future genetic studies and to be potentially considered a translational model.

Legend to the Video

Video 1. A 3-year-old female English Bulldog displaying small-amplitude, high-velocity head tremor in a vertical direction. The dog appears to be fully responsive and can be called by the owners.

Video 2. A 3-year-old female English Bulldog lying in right lateral recumbency showing the same type of head tremors as in Video 1. ■

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