



Comorbidities between behavioral problems and neurological disorders in an American Staffordshire Terrier

Océane Richard^{1*}, Emmanuel Gaultier²

¹ *Université de Toulouse, ENVT, 23 chemin des Capelles, 31300 Toulouse, France; oceanerchrd@gmail.com*

² *Veterinary behaviorist freelance*

Abstract: A 2-year-old male neutered mixed-breed dog, including American Staffordshire Terrier, was evaluated for human-directed aggression especially when there was a resource at stake. The patient also had difficulties managing his emotions and could become aggressive toward other dogs. The dog received a diagnosis of Hypersensitivity-Hyperactivity and communication trouble. The treatment plan included a pharmacological treatment with fluoxetine at 2.3 mg/kg/day and the application of behavioral therapy aimed at reducing impulsivity and aggression while introducing predictability to the patient's routine. This significantly improved the dog's behavior. He became less aggressive, more friendly toward other dogs, and had better sleep patterns. However, he began to experience neurological issues such as ataxia and tiredness along to lumbar pain. The dog also started to exhibit worsening neurological problems, including progressive vision loss, which made him increasingly irritable. Despite introducing new exercises to help the owner address these various issues and the real appeasement of the patient, the dog severely bit again. With the behavior becoming more and more unpredictable, and the pain and cognitive problems worsening, the decision was made to euthanize the patient shortly thereafter.

Key Words: aggression, dog, neurological disorder, hyperactivity.

* *Corresponding Author:* oceanerchrd@gmail.com

Presentation

The patient is a 2 years and 2 months old, male neutered, mixed-breed dog, including American Staffordshire Terrier, weighing 26.5 kg.

History and presenting signs

The patient was adopted at 23 months of age from a couple who rescued him from his first family, where he was kept on a balcony with his faeces for an entire year. He was thin because of carelessness. He stayed with the rescuing couple for 7 months before being adopted by his new owner. During his time with them, he never had contact with other animals. He lived in a one-bedroom leased apartment with an adult woman. There was a patio where he could go, but only under supervision. The owner's boyfriend visited frequently. After the adoption, the patient developed conjunctivitis and otitis, and the treatment was challenging to administer.

Shortly after adoption, the owner began to experience episodes of aggression. Whenever the patient had a resource like a toy or bone, if the owner tried to take it away, he would growl and could potentially bite. There were instances when the owner did not intend to take anything from him but accidentally came too close to one of his toys, leading to growling and an attack on an object, such as a broom. The patient also bit several people, even on the street, when they weren't interacting with him. The owner of the apartment, who lived above, occasionally came without notice, and the patient already bit his pants because he used to excite him. Warning signs preced-

ing these aggressive episodes included dilated pupils, growling and tense body posture. Although the bites did not cause significant harm, they were concerning.

The patient used to have his food ad libitum and could eat whenever he wanted and received leftovers during owner's meal. He followed a lot his owner and jumped on her or was abrupt and insistent when he wanted some contact. He was also very excited with people coming home, jumping, and chewing their hands for several minutes. He could play for a long time without control.

The owner consulted a dog trainer who suggested that the patient was becoming increasingly comfortable and trying to assert "dominance". As a result, the owner stopped trying to take things from him and instead tried to distract him or offer something else in exchange. Avoiding confrontational situations enabled episodes of aggression against humans to be avoided, but the dog's control difficulties and its behavior linked to high and frequent excitability were still present. The patient displayed aggression towards other dogs and was highly active, trying to escape from the garden. He struggled to maintain focus outside as everything seemed interesting to him and pulled a lot on the leash. He easily got excited, especially in car, and sometimes chewed the owner's hands. He frequently chased his tail when he got excited, excessively licked his legs, and did not sleep much (he lied down about 10 hours per day).

Three months after the adoption, as the dog trainer intervention focused on avoiding situations of aggression toward humans but did not provide a reliable solution to the patient's control difficulties, the owner sought help from a veterinary behaviorist. She began considering whether it might be best for the patient to be rehomed with someone else.

Physical and laboratory evaluation

A physical examination was conducted during the initial consultation with the veterinary behaviorist at the clinic. The patient was friendly and readily approached for attention. He explored the room dynamically and even jumped onto the desk to see what was on it. The examination was within normal limits. The patient weighed 26.5 kg with a body condition score (BCS) 5/9.

One month after the consultation, he began urinating indoors. A urinary infection was diagnosed, and the owner treated it. However, the patient started to exhibit ataxia and extreme fatigue.

A neurological examination was subsequently performed revealing paresis localized between T3-L3. A urinary analysis was conducted, and the results were normal.

Two months later, a follow-up neurological examination was performed. A blood analysis showed only eosinophilia. The working hypothesis was a cerebellar disease. Genetic analysis to search for ceroid lipofuscinosis returned normal results. A scanner was performed, revealing abnormalities in cerebral folds, suggesting the presence of a metabolic or inflammatory process. Additionally, the patient had hip sub-luxation. Cerebrospinal fluid analysis was within normal limits.

The patient's vision deteriorated progressively, and he began stumbling over obstacles on the floor. Back pain made it difficult for him to perform certain movements, such as getting into the car.

Diagnosis

The patient exhibited the following symptoms: phases of excitement manifesting as biting, frustration during playing time without the possibility to calm down, playing with ordinary objects, jumping on people, licking his legs, and chasing his tail when he was at rest, highly active with few hours lying on the floor. He was also aggressive toward people in different contexts including resource guarding and sometimes with other dogs. The patient was experiencing im-

pulsivity, frustration, emotional overload, and irritability which have led to aggression.

Differentials for human-directed aggression in dogs include fear, conflict, or communication issues (resource guarding aggression, territorial aggression), lack of self-control or impulsive aggression, psychiatric trouble (dissociative syndrome, dysthymic disorders, or canine autism), play-related aggression, predatory behavior, or issues related to health (such as pain or neurological problems) (Sueda & Malamed, 2014; Masson et al., 2023).

The dog has a comorbidity. In fact, the entire clinical picture is explained by the presence of two problems. Firstly, the behaviors associated with lack of self-control (impulsive biting, difficulty in dealing with frustration, emotional overload, spinning, see Table 1) are linked to the presence of a neuro-developmental disorder called Hypersensitivity-Hyperactivity syndrome (HSHA) according to the approach of French veterinary psychiatry community (Pageat, 1998; Beata, 2011; Landsberg, 2003; Marlois et al., 2022; Masson et al., 2023). Secondly, the aggressive behavior is linked to communication and socialisation disorders, due do the poor living conditions with its previous owners (few social contacts, lack of educational environment). The diagnosis of Hypersensitivity-Hyperactivity Syndrome is the clinical equivalent of human ADHD and two clinical stages, linked to the level of severity, have been described in dogs (see Table 1) (Pageat, 1998; Beata, 2001; Landsberg, 2003; Masson et al., 2023). In the present case, environmental conditions strongly impacted the duration of sleep and so the dog was diagnosed as stage 2.

HSHA symptoms	Patient symptoms
<p>Stage 1:</p> <ul style="list-style-type: none"> - Lack or delay in acquiring bite control in a puppy over 2 months of age (2, 4) and locomotion (4) - Inability to stop a behavioral sequence or immediate start of a new one (2) - Hypersensitivity associated with a behavioral sequence in reaction to any stimulus, even to those that are continuously present in the dog's environment (2) - No fatigability (4) - Exacerbated oral exploration (4) - Abrupt social interactions (4) - Barking (4) - Productive behaviors such as spinning, licking or non-sexual humping (4) 	<ul style="list-style-type: none"> - Chewing hands when excited (play, car, people arriving...) - Could play a long time without the ability to stop - Still playing with leaf in the street
<p>Stage 2:</p> <ul style="list-style-type: none"> - Stage 1 criteria (1) - Lack of food satiety (1, 3, 4) - Hyposomnia: under 8 hours of sleep per 24 hours (1, 3, 4) - Hypermotricity (3) 	<ul style="list-style-type: none"> - Jumping on people and chewing their hands - Chasing his tail and licking his legs - Did not sleep much, highly active

Table 1. Diagnostic criteria for the HSHA syndrome compared to the patient symptoms.

(1) Masson & Gaultier (2018), (2) Marlois et al. (2022), (3) Bleuer-Elsner et al. (2021), (4) Masson et al. (2023)

These conclusions were based on the owner's reported history and the patient behavior during the consultation.

The physical examination did not reveal any sign of altered awareness or pain, and the owner did not report noticing anything unusual.

Treatment

The veterinary behaviorist initially diagnosed hypersensitivity-hyperactivity (Pageat, 1998) associated with communication issues. A treatment plan was prescribed to help the patient gain better control of his emotions and reduce his aggressiveness. Fluoxetine was prescribed at 2.3 mg/kg/day, administered once a day in the morning (Masson & Gaultier, 2018; Odore et al., 2020; Bleuer-Elsner et al., 2021).

To manage human-directed aggression, the primary objective is to ensure safety. Avoiding situations in which the dog has previously displayed aggression is crucial (Reisner, 2003). The use of a muzzle is one of the best ways to prevent bites. A specific strategy plan should be prescribed for each case of an aggressive dog.

The management plan included implementing rules to create more predictability in the patient's daily routine. The owner was instructed to provide food to the patient twice a day, with each meal lasting for 20 minutes, and to avoid disturbing him during mealtimes. Removing the food after 20 minutes was also recommended to reduce resource guarding behavior. Since the owner was feeding the patient homemade food, this approach would help minimize sanitation issues. Any leftovers were to be placed in the patient's bowl separately from the owner's meal. The owner was advised to use "swap" method to retrieve resources from the patient when necessary. Emotion control exercises were demonstrated. For instance, the owner would hold a treat in her closed hand and show it to the dog. While the dog attempted to access the treat, either by pawing, nudging, licking, or sniffing, the owner was instructed not to provide the treat. Only when the dog stopped trying to obtain the treat should the owner reward him. Additionally, the owner was advised to interact with the dog only when he was calm. If the dog became overly excited, isolation could be used to help calm him down. The owner was finally told to keep the dog away from visitors when they arrived until he became quiet, allowing him to greet guests only when he exhibited calm behavior.

Follow-up

The owner reported a rapid improvement in the patient's behavior with the introduction of fluoxetine. The patient became calmer, no longer attempted to escape from the garden, ceased to display aggression toward people entering the home, walked on the leash without pulling, and remained calm in the car for extended periods. He also experienced longer and better sleep at home.

Although there was still some resource guarding behavior, the owner could easily retrieve objects, and the patient exhibit reduced aggression. He no longer became overly excited during playtime and could stop on his own and go to sleep. He became more sociable with other dogs and was less bothersome. The self-control exercises were successfully acquired. However, approximately 1.5 months after starting fluoxetine, the patient began to exhibit neurological issues. A T3-L3 paresis was diagnosed. An attempt was made to discontinue the medication to assess its impact, but it did not lead to an improvement. So, the medication was not the cause of the neurological disorders.

As the patient started to show signs of ataxia, difficulty jumping, and progressive vision loss, a neurological component was added to the diagnosis (Amadei et al., 2016).

The owner was advised to resume the medication at the same dosage, considering the positive effects on the patient's behavior, and he continued to make progresses. Additional exercises were regularly added to assist the owner in managing the challenges posed by her dog. Medical training was recommended, along with video tutorials, and providing the patient with chewing toys to help manage his emotions.

Six months later, the patient's neurological problems worsened. He experienced complete loss of sight, joint pain, ataxia, and heightened irritability. After severely biting his owner following an altercation with another dog who attacked him and considering his increasing unpredictability and suffering from neurological issues, the decision was made to euthanize him a few weeks later.

Despite these issues, he remained quiet and sociable with other dogs, always remaining un-leashed when outside.

Summary and discussion

Aggression is one of the most frequent reasons for consulting a veterinary behaviorist due to the potential risk it poses for people spending time with the dog. Various causes exist, with resource guarding (Beaver, 1994) being a frequent occurrence. It appears that young adult male dogs, typically between 1 and 3 years old, are more prone to this type of aggression.

Lack of self-control and impulsivity can also lead to aggression towards humans in conflict situations (Fatjo et al., 2005; Wright et al., 2011).

Additionally, other medical conditions can overlap and complicate overall behavior, including pain (Beaver, 1994), neurological problems (Camps et al., 2019), or genetic factors. Moreover, developmental and living conditions such as prenatal environment, early experiences (Baslington et al., 2023) or characteristics of the owners (particularly those under 25 years old) (Casey et al., 2014) can influence a dog's behavior.

In this specific case, the puppy's developmental environment was unknown, but the conditions of confinement afterward were very poor. The patient suffered from neglectful mistreatment, which partially could explain the behavioral issues. Indeed, he has never truly had proper rules of living, lacking proper socialization with humans and dogs. There has been a food deficiency, which may partially explain resource guarding. Furthermore, he has not received proper education, and as a result, has not developed frustration management or self-control skills. Additionally, there is a developmental disorder involving emotional regulation problems. There is no consensus about HSHA diagnosis in dogs. But some studies name it and compare it to human ADHD. Pet dogs can spontaneously present hyperactivity, impulsivity, and difficulties of concentration as it happens in humans. Sulkama and coworkers (2021) conducted a large survey of 11 000 Finnish pet dogs. They quantified their level of hyperactivity/impulsivity and inattention. They found out that young male dogs from medium to large size, were more represented with high levels of hyperactivity/impulsivity and inattention. They also showed that this behavioral issue had strong comorbidities with compulsive disorder, aggressiveness, and fearfulness. Moreover, some environmental factors exacerbate the issue, such as a lack of physical exercise and inadequate training. However, in the current case, the change of ownership and the intervention of a dog trainer have not led to an improvement in the dog's behavior. Beyond clinical signs leading to a diagnosis of HSHA, it is also possible to measure certain neurotransmitters in the blood to support this diagnosis. Indeed, Gonzalez-Martinez and colleagues (2023) demonstrated that serotonin and dopamine were found in lower concentrations in dogs exhibiting ADHD-like symptoms. These studies help to understand the beneficial effects of treatments targeting circulating serotonin and dopamine concentrations in dogs with a diagnosis of ADHD-like. The patient, here, showed aggressiveness due to impulsivity and frustration and compulsive behaviors as he was spinning and licking his legs. HSHA diagnosis can explain those behaviors.

But also, neurological, and painful disorders, that have altered the dog's perception of its environment, can play a role (Denenberg, 2021). As the patient was presenting neurological issues, the spinning and licking could be explained by medical conditions. It could be simple partial seizures or partial complex seizures as the patient was also aggressive (Landsberg, 2003). Also, peripheral neuropathies could be responsible of spinning. In the present case, fluoxetine regulated the productive behavior. But it would have been interesting to use an anti-convulsant to assess its effects on the patient's overall behavior.

Moreover, cerebellar cortical degeneration is one of the potential genetic diseases known in American Staffordshire Terrier. There is no cure treatment, and it is not possible to have a definitive diagnosis antemortem. While some affected dogs exhibit aggression towards other dogs, no aggression towards humans has been reported (Olby et al., 2004).

Pain is a major component of behavioral problems. It causes vulnerability and hypervigilance which can increase aggressiveness, anxiety and compulsive disorders (Denenberg, 2021). The dog exhibited lumbar pain that could induce tail chasing. Other joint pains, whether related or not to its neurological issues, may also account for the excessive licking of the paws. After the implementation of the therapeutic plan, the patient exhibited less licking than at the time of the initial consultation. However, the owner still reported a few episodes when at rest, that could indeed be explained by neuropathic pain, joint issues, or food allergies.

Human-directed aggression is not only a public health problem but also a major cause of relinquishment or euthanasia in dogs (Salman et al., 2000; Lund et al., 2010).

In case of human-directed aggression, the first objective is to protect people. If it concerns resource guarding aggression, the owner can exchange the object with another one or teach a release cue using clicker training (Luescher & Reisner, 2008). It is also essential to stop physical punishment, practice general obedience daily, and use desensitization and counterconditioning (Reisner, 2003) to teach the dog alternative behavior to aggression.

Drug therapy is often used in combination with behavioral therapy. Fluoxetine, a selective serotonin reuptake inhibitor (SSRI) is the most common treatment prescribed in case of behavioral trouble. Fluoxetine works by selectively inhibiting the reuptake of serotonin and downregulating 5-Hydroxy-tryptamine trifluoroacetate 1 receptor, conducting to an increase of the availability of serotonin in the synaptic cleft (Papich, 2016). This medication is currently used for conditions like impulsivity (in HSHA syndrome), and aggressiveness (Mege et al., 2003; Masson & Gaultier, 2018; Chutter et al., 2019; Odore et al., 2020; Bleuer-Elsner et al., 2021).

Some side effects such as lethargy and reduced appetite have been reported (Irimajiri et al., 2009; Masson & Gaultier, 2018).

However, fluoxetine has been ineffective in cases of human ataxia or cerebellar degeneration (Monte et al., 2003; Sarva & Shanker, 2014). In this case, fluoxetine decreased aggression due to his behavioral issues, but the ataxia and neurological trouble were not settled with the treatment. Indeed, if the patient had not present neurological trouble, aggression and HSHA symptoms would have decreased or disappeared as was the case at the beginning of the treatment.

Indeed, Badino and coworkers (2004) showed that 5-hydroxy-tryptamine trifluoroacetate low-affinity receptors (HTR LA) significantly increased in the entire central nervous system of aggressive dogs, while 5-HT high-affinity receptors increased only in the thalamus and hypothalamus. This suggests that the serotonergic system possibly plays a role in canine aggressive behavior. The use of an SSRI such as fluoxetine aligns with the variations in catecholamines seen in aggressive dogs (Badino et al., 2014).

Further research on the comorbidity between neurological disorders and behavioral issues is necessary in veterinary medicine.

Acknowledgements

The authors would like to thank the dog and his owner for accepting to be published in a case report.

Conflict of interest

The authors have no conflict of interest to declare.

References

- Amadei E., Cantile C., Gazzano A., Mariti C. Behavioral Signs and Neurological Disorders in Dogs and Cats. *Mathews J Vet Sci.* 2016; 1:001.
<https://www.mathewsopenaccess.com/full-text/behavioral-signs-and-neurological-disorders-in-dogs-and-cats>
- Badino P., Odore R., Osella M.C., Bergamasco L., Francone P., Girardi C., Re G. Modifications of serotonergic and adrenergic receptor concentrations in the brain of aggressive *Canis familiaris*. *Comp. Biochem. Physiol. A Mol. Integr. Physiol.* 2004;139(3):343-50.
<https://www.sciencedirect.com/science/article/abs/pii/S1095643304002697?via%3Dihub>
- Baslington-Davies A., Howell H., Hogue T.E., Mills D.S. An Assessment of Scientific Evidence Relating to the Effect of Early Experience on the Risk of Human-Directed Aggression by Adult Dogs. *Animals.* 2023; 13(14):2329.
<https://www.mdpi.com/2076-2615/13/14/2329>
- Beata., C. Diagnosis and Treatment of Aggression in Dogs and Cats. *Recent Advances in Companion Animal Behavior Problems.* 2001.
<https://www.ivis.org/library/recent-advances-companion-animal-behavior-problems/diagnosis-and-treatment-of-aggression>
- Beaver B.V. Owner complaints about canine behavior. *J. Am. Vet. Med. Assoc.* 1994;204(12):1953-5.
<https://pubmed.ncbi.nlm.nih.gov/8077144/>
- Bleuer-Elsner S., Muller G., Beata C., Zamansky A., Marlois N. Effect of fluoxetine at a dosage of 2-4 mg/kg daily in dogs exhibiting hypersensitivity-hyperactivity syndrome, a retrospective study. *Journal of Veterinary Behavior.* 2021; 44, 25-31.
<https://www.sciencedirect.com/science/article/abs/pii/S1558787821000435>
- Camps T., Amat M., Manteca X. A Review of Medical Conditions and Behavioral Problems in Dogs and Cats. *Animals.* 2019;9(12):1133.
<https://www.mdpi.com/2076-2615/9/12/1133>
- Casey R. A., Loftus B., Bolster C., Richards G. J., Blackwell E. J. Human directed aggression in domestic dogs (*Canis familiaris*): Occurrence in different contexts and risk factors. *Applied Animal Behavior Science.* 2014; 152, 52-63.
<https://www.sciencedirect.com/science/article/abs/pii/S016815911300292X>
- Chutter M., Perry P., Houpt K. Efficacy of fluoxetine for canine behavioral disorders. *J. Vet. Behav.* 2019; 33:54-58.
<https://www.sciencedirect.com/science/article/abs/pii/S1558787819301005?via%3Dihub>
- Denenberg S. (2021). *Small animal veterinary psychiatry.* Oxford: CAB International.
- Fatjó J., Amat M., Manteca X. Aggression and impulsivity in dogs. *The Veterinary Journal.* 2005; 169, 150.
https://www.researchgate.net/publication/284893375_Aggression_and_impulsivity_in_dogs
- González-Martínez Á, Muñoz de Miguel S, Graña N, Costas X, Diéguez FJ. Serotonin and Dopamine Blood Levels in ADHD-Like Dogs. *Animals (Basel).* 2023 Mar 13;13(6):1037. doi: 10.3390/ani13061037. PMID: 36978578; PMCID: PMC10044280.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10044280/pdf/animals-13-01037.pdf>

- Irimajiri M., Luescher A.U., Douglass G., Robertson-Plouch C., Zimmermann A., Hozak R. Randomized, controlled clinical trial of the efficacy of fluoxetine for treatment of compulsive disorders in dogs. *J Am Vet Med Assoc.* 2009; 235:705-9.
<https://avmajournals.avma.org/view/journals/javma/235/6/javma.235.6.705.xml>
- Landsberg G., M. 2003. Handbook of behavior problems of the dog and cat. G. Landsberg W. Hunthausen L. Ackerman. Edinburgh ; New York, Saunders.
- Luescher A.U., Reisner I.R. Canine aggression toward familiar people: a new look at an old problem. *Vet Clin North Am Small Anim Pract.* 2008;38(5):1107-30, vii.
<https://www.sciencedirect.com/science/article/abs/pii/S0195561608001083?via%3Dihub>
- Lund H.S., Eggertsson S., Grøndahl A.M., Eggertsdóttir A.V. Views on euthanasia and the rehoming of dogs in Norway and Iceland. *Vet Rec.* 2010;166(24):749-52.
<https://bvajournals.onlinelibrary.wiley.com/doi/10.1136/vr.b4856>
- Marlois N., Groux D., Mege C., Beata C., Sarcey G., Massal N., Masson S., Subtil F., Marion M. Assessment of a canine Hypersensitivity – Hyperactivity syndrome rating scale. *Dog Behavior.* 2022; (2): 1-14.
<https://dogbehavior.it/dogbehavior/article/view/144>
- Masson S., Bleuer-Elsner S., Muller G., Medam T. 2023. Psychiatrie vétérinaire du chien. NoLedge Edition.
- Masson, S., Gaultier E. Retrospective Study on Hypersensitivity-Hyperactivity Syndrome in Dogs: Long-Term Outcome of High Dose Fluoxetine Treatment and Proposal of a Clinical Score. *DOG BEHAVIOR* 4, no. 2, 2018: 15–35.
<https://sylvia-masson.com/wp-content/uploads/2020/03/2018-Dog-behavior-Restrospective-study-on-HSHA.pdf>
- Mege C., Beata C., Beaumont-Graff E., Diaz C., Habran T., Marlois N., Muller G., 2003. Pathologie comportementale du chien. Masson-AFVAC, Paris.
- Monte T.L., Rieder C.R., Tort A.B., Rockenback I., Pereira M.L., Silveira I., Ferro A., Sequeiros J., Jardim L.B. Use of fluoxetine for treatment of Machado-Joseph disease: an open-label study. *Acta Neurol Scand.* 2003;107(3):207-10.
<https://onlinelibrary.wiley.com/doi/abs/10.1034/j.1600-0404.2003.02132.x?sid=nlm%3Apubmed>
- Odore R., Rendini D., Badino P., Gardini G., Cagnotti G., Meucci V., Intorre L., Bellino C., D'Angelo A. Behavioral Therapy and Fluoxetine Treatment in Aggressive Dogs: A Case Study. *Animals.* 2020;10(5):832.
<https://www.mdpi.com/2076-2615/10/5/832>
- Olby N., Blot S., Thibaud J.L., Phillips J., O'Brien D.P., Burr J., Berg J., Brown T., Breen M. Cerebellar cortical degeneration in adult American Staffordshire Terriers. *J Vet Intern Med.* 2004;18(2):201-8.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1939-1676.2004.tb00161.x?sid=nlm%3Apubmed>
- Pageat, P. (1998). Pathologie du comportement du chien. 2e éd. Maisons-Alfort : Ed. Point vétérinaire. Collection Veterinary Medicine.
- Papich M.G. 2016. Saunders Handbook of Veterinary Drugs: Small and Large Animal., 4th ed. Elsevier, St. Louis, MO, PP 339-341.
- Reisner IR. Differential diagnosis and management of human-directed aggression in dogs. *Vet Clin North Am Small Anim Pract.* 2003;33(2):303-20.
<https://www.sciencedirect.com/science/article/abs/pii/S0195561602001328?via%3Dihub>
- Salman M.D., Hutchison J.M., Ruch-Gallie R.A., Kogan L.R., New J.C., Kas, P.H., Scarlett J.M. Behavioral Reasons for Relinquishment of Dogs and Cats to 12 Shelters. *J. Appl. Anim Welf. Sci.* 2000; 3, 106 - 93.
https://www.academia.edu/16081029/Behavioral_Reasons_for_Relinquishment_of_Dogs_and_Cats_to_12_Shelters
- Sarva H., Shanker V.L. Treatment Options in Degenerative Cerebellar Ataxia: A Systematic Review. *Mov Disord Clin Pract.* 2014;1(4):291-298.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6183008/>
- Sueda K.L., Malamed R. Canine aggression toward people: a guide for practitioners. *Vet Clin North Am Small Anim Pract.* 2014;44(3):599-628.
<https://pubmed.ncbi.nlm.nih.gov/24766702/>
- Sulkama S., Puurunen J., Salonen M., Mikkola S., Hakanen E., Araujo C., Lohi H. Canine hyperactivity, impulsivity, and inattention share similar demographic risk factors and behavioural comorbidities with

human ADHD. *Transl Psychiatry*. 2021 Oct 1;11(1):501. doi: 10.1038/s41398-021-01626-x. PMID: 34599148; PMCID: PMC8486809.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8486809/pdf/41398_2021_Article_1626.pdf

Wright H. F., Mills D. S., Pollux P. M. Development and Validation of a Psychometric Tool for Assessing Impulsivity in the Domestic Dog (*Canis familiaris*). *International Journal of Comparative Psychology*, 2011; 24(2).

<https://escholarship.org/uc/item/7pb1j56q>

Comorbidità tra problemi comportamentali e disturbi neurologici in un American Staffordshire Terrier

Océane Richard^{1*}, Emmanuel Gaultier²

¹ *Université de Toulouse, ENVT, 23 chemin des Capelles, 31300 Tolosa, Francia;*
oceanerchr@gmail.com

² *Veterinario comportamentalista*

Sintesi

Un cane meticcio di American Staffordshire Terrier, maschio castrato di 2 anni, è stato valutato per aggressione diretta dall'uomo, soprattutto quando c'era una risorsa in gioco. Il paziente aveva anche difficoltà a gestire le proprie emozioni e poteva diventare aggressivo nei confronti degli altri cani. Il cane ha ricevuto una diagnosi di ipersensibilità-iperattività e problemi di comunicazione. Il piano di trattamento prevedeva un trattamento farmacologico con fluoxetina a 2,3 mg/kg/giorno e l'applicazione di una terapia comportamentale volta a ridurre l'impulsività e l'aggressività introducendo prevedibilità nella routine del paziente. Ciò ha migliorato significativamente il comportamento del cane. È diventato meno aggressivo, più amichevole verso gli altri cani e ha avuto un sonno migliore. Tuttavia, iniziò ad avvertire problemi neurologici come atassia e stanchezza, oltre a dolore lombare. Il cane iniziò anche a manifestare un peggioramento dei problemi neurologici, inclusa la progressiva perdita della vista, che lo rese sempre più irritable. Nonostante l'introduzione di nuovi esercizi per aiutare il proprietario ad affrontare questi vari problemi e per tranquillizzare il paziente, il cane ha morso di nuovo gravemente. Poiché il comportamento diventava sempre più imprevedibile e il dolore e i problemi cognitivi peggioravano, poco dopo fu presa la decisione di sopprimere il paziente.

