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1 **Case report**

2

3 **Hyperactive behavior in a Weimaraner dog**

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20

21 **Abstract**

22 A 9-month-old intact male Weimaraner dog was referred because of pica, once medical
23 causes were ruled out. The detailed history and the behavioral examination revealed not only
24 pica but also impulse-control problems, increased excitability, destructiveness, attention
25 deficits and inability to relax. Hyperkinesis was discarded considering normal vital signs and

26 the non-clear paradoxical effect during the central nervous system (CNS) stimulant test. The
27 presumptive diagnosis was hyperactivity. Behavioral therapy initially included avoiding
28 conflict situations and never reinforcing nor punishing the dog if these occurred, as well as
29 reinforcing calm states, increasing both play and exercise and starting with obedience training
30 sessions. The dog really improved at home but not in the street, which led the owners to
31 drastically shorten walks. This situation, in turn, made the dogs' behavior worse, as he
32 showed redirected aggression toward the owners when they tried to move him away from any
33 new social and non-social stimuli during the walk. The improvement of the dog was finally
34 achieved with a combination of behavioral therapy, castration and fluoxetine (1.5 mg/kg, PO,
35 q 24h). The negative role of confinement of hyperactive dogs as a consequence of their
36 excessive behavior, as well as other contributing factors to canine hyperactivity, are
37 discussed.

38

39 **Keywords:** dog, behavior problems, overactivity, hyperactivity, hyperkinesis, pica.

40

41 **Introduction**

42 Overactive behavior could be defined as a high level of energy associated with an increase of
43 the motor activity and of the social, exploratory and play behaviors. Hyperactivity in dogs,
44 also referred to as overactivity, includes an excessive degree of restlessness, inability to learn,
45 poor habituation, and difficulty to adjusting to new surroundings (Beaver, 1999).
46 Hyperactivity is a common complaint that describes overreactivity, excitability and/or
47 overactivity (Horwitz and Neilson, 2007), but it has been suggested to be overdiagnosed, as
48 most dogs that clients believe are hyperactive are either overactive or underexercised
49 (Overall, 1997).

50 The possible causes or contributing factors to canine hyperactivity include genetic
51 predisposition, social and sensory deprivation, unintentional reinforcement and physiological
52 abnormalities (Landsberg et al., 2003; Horwitz and Neilson, 2007). Hyperactivity problems
53 are widely distributed among canine breeds but are especially prevalent among hunting and
54 working breeds, since they are dogs selectively bred for enhanced environmental alertness,
55 vigilance and high activity levels (Hart and Hart, 1985; Overall, 1997; Lindsay, 2001;
56 Landsberg et al., 2003; Horwitz and Neilson, 2007). An early weaning can also be considered
57 as a predisposing factor, since social contact deprivation during early development could
58 cause the puppy to make various compensatory and excessive efforts to make up for this lack
59 (Lindsay, 2001).

60

61 It is important to mention that only a few hyperactive dogs are truly hyperkinetic. The
62 pathophysiology of hyperkinesis is not fully understood. Hyperkinesis is a very rare condition
63 which includes the symptoms of a hyperactive dog but with altered physiological signs,
64 namely elevated baseline heart rate, respiratory rate, and temperature when at "rest" with
65 lower than expected increases when exercised (Voith, 1980). This condition is characterized
66 by paradoxically answering to CNS stimulants (Overall, 1997; Beaver, 1999; Lindsay, 2001;
67 Landsberg et al., 2003; Horwitz and Neilson, 2007) and by abnormalities in the dopaminergic,
68 noradrenergic, or serotonergic systems (Horwitz and Neilson, 2007).

69

70 **History and presenting signs**

71 The dog was a 9-month-old intact male Weimaraner weighing 27 kg, who had been purchased
72 from a non-professional breeder at 5 weeks of age. Prior to acquisition, the dog remained with
73 his dam and littermates. The owners, a young couple, reported both medical and behavioral
74 problems from a very early age.

75

76 The dog was referred by a specialist in internal medicine because of pica, once medical causes
77 were ruled out. The dog showed chronic diarrhea from adoption but this problem had been
78 successfully controlled at the moment of consultation with the use of a muzzle during the
79 walks and a hypoallergenic diet, which suggested a problem of food intolerance. However,
80 diarrhea occasionally still occurred whenever the dog consumed any non-hypoallergenic food
81 or non-nutritional material as a consequence of pica.

82

83 With regard to behavioral problems, owners reported permanent nervousness and lack of
84 control both at home and in the street, in spite of the diary exercise sessions the dog practiced,
85 including agility training. At home, the dog was described as being incapable of relaxing,
86 following the owners all the time. The dog used to seek attention by nibbling at his owners'
87 clothes and, in the last weeks, also by mounting them. In addition, the dog showed
88 destructiveness (and ingestion) of any object within reach. Eventually, he showed tail chasing,
89 flank sucking and limb licking. Outdoors, the owners recognized to be overwhelmed by the
90 problem, as the dog sharply pounced upon people, nibbling or biting their clothes, and pulling
91 on his leash. During these situations, the dog did not bark nor growl at people but showed a
92 straight body position with erect ears and tail and sometimes piloerection. All these behaviors
93 directed toward people worsened when the dog was on leash. He also barked at other dogs
94 when he was on leash but played with them when unleashed. Apart from this, the dog showed
95 signs of pica by eating sticks, grass, papers or any small objects he found during the walk.
96 The owners had observed that the more signs of pica he showed during the walks, the more
97 severe the diarrhea was the next day, but also that severe diarrhea aggravated his behavioral
98 excesses. At the moment of consultation, and as consequence of the previously described

99 problems, walks had become really short, lasting only a few minutes (10) and making the
100 dogs' behavior worse as a result of the limited time for exercise and play.

101

102 The owners had tried a number of strategies to correct the dogs' behavior at home, including
103 verbal punishment, to which the dog reacted by growling, and enclosing the dog in his crate,
104 where he seemed to calm down. They also unsuccessfully tried to prevent mounting by
105 making the dog get down to the floor, counterconditioning with a sit command and ignoring
106 the dog. In the street, different tools were also used in order to stop the pulling on leash habit,
107 including a head collar, which only worked during the first days, and a non-pull harness,
108 which increased nervousness in the dog. Finally, a muzzle was used during the walk to avoid
109 pica, although sometimes the dog was capable of eating non-nutritional material even while
110 wearing it.

111

112 **Physical and laboratory evaluation**

113 A number of tests had been previously performed by the referring internist to rule out medical
114 causes for pica, including a coprologic analysis, abdominal ultrasonography, gastrointestinal
115 endoscopy and biopsy, and canine immunoreactive trypsin, B vitamin and folic acid
116 analyses. The results of all these tests were normal. Results of cell blood count and
117 biochemical analysis were also within the reference limits. Food intolerance was diagnosed as
118 the cause of the diarrhea, and pica was considered as an aggravating factor.

119

120 At the moment of behavioral consultation, physical and neurological exams were carried out,
121 with no remarkable findings (100 bpm, 38.7°C) except for the constant panting of the dog.

122 During the visit, the dog constantly jumped on clinicians, rubbed his muzzle against his

123 owner's legs and barked at some of the students. He even chewed and broke the clinician's flat
124 shoe in a matter of seconds, in spite of wearing the muzzle.

125

126 **Diagnosis**

127 A diagnosis of hyperactivity was carried out considering the signs of pica, impulse-control
128 problems, increased excitability, destructiveness, attention deficits and inability to relax (Hart
129 and Hart, 1985; Overall, 1997; Lindsay, 2001; Landsberg et al., 2003; Horwitz and Neilson,
130 2007). Hyperactive dogs are especially sensitive and reactive to novelty or the presence
131 of unfamiliar people or animals, often displaying a pronounced inability to habituate to such
132 stimulation, which could explain this dog's reactions to strangers (Lindsay, 2001). Stereotypic
133 behaviors were also diagnosed, as the dog eventually showed tail chasing, flank sucking and
134 limb licking. These behaviors were sometimes performed short after the interruption of
135 undesirable behaviors by the owners and, therefore, could have been considered as
136 displacement activities.

137

138 The dog in the present report fulfills several of the predisposing factors for hyperactivity as
139 previously defined. Thus, he belongs to a hunting breed, Weimaraners, which are predisposed
140 to overactivity (Beaver, 1999). In addition, he was separated from his dam and littermates
141 when he was 5 weeks old, an early age for weaning and adoption in dogs (Westgarth et al,
142 2012), and this may have influenced the way he behaved with people in the street (by jumping
143 on) and with his owners (by constantly demanding attention). Furthermore, involuntary
144 reinforcement by the owners could also be another contributing factor in the development of
145 hyperactivity in this case, since they used to pay attention to the dog when he showed
146 undesirable behaviors.

147

148 Increased vigilance and scanning, autonomic hyperactivity, increased motor activity,
149 destructiveness, excitability, panting and pacing may be also signs of generalized anxiety
150 (Overall, 1997; Lindsay, 2001). However, anxious dogs usually exhibit hesitant or avoidance
151 behavior, or trembling (Overall, 1997; Horwitz and Neilson, 2007), which did not match with
152 the present dogs' behavior, as suggested by his attitude toward people and the related body
153 language. Attention seeking behavior was not considered as a separate diagnosis but as a
154 symptom, as the ignorance of these behaviors by the owners did not stop nor diminish them.
155 Hyper-reactivity was also ruled out as this dog showed his excessive behavior whether an
156 external stimulus was present or not and as no low-energy phases were observed (Overall,
157 2013).

158

159 Medical conditions such as metabolic disturbances, endocrine diseases, neurological
160 conditions or pharmacological interventions, can produce physiological signs coinciding with
161 those observed in hyperactive individuals (Overall, 1997; Overall, 2013). However, results of
162 blood tests were normal and no clinical signs indicative of hypothyroidism or neurologic
163 abnormalities were detected during examination.

164

165 Despite vital signs were within the normal limits, a CNS stimulant test was performed in
166 order to rule out a real hyperkinesia (Hart and Hart, 1985; Overall, 1997; Lindsay, 2001,
167 Landsberg et al., 2003; Horwitz and Neilson, 2007). For the test, the dog was orally
168 administered 0.2 mg/kg of methylphenidate and kept under intrahospital vigilance for 2 hours
169 (Voith, 1980; Landsberg et al., 2003), monitoring both physiological (heart rate and
170 respiratory frequency) and behavioral parameters. Later, at home, owners were instructed to
171 increase the dosage in 0.1 mg/kg every day and to communicate daily with the clinicians
172 about the evolution of signs. Significant behavioral changes were not observed during the test,

173 although the owners reported that shortly after methylphenidate administration, the dog went
174 to rest to his crate. However, when the dog was administered a 0.8 mg/kg PO, q 12 h, dose of
175 methylphenidate, the owners detected hair loss, anorexia and sensation of hyperthermia (hot
176 ears), and interrupted the drug administration by themselves. Despite those results, the test
177 was not conclusive, as it was interrupted before a higher dose could be administered. Also, the
178 absence of clear paradoxical effects and the normal vital signs during the test prompted the
179 clinicians to discard hyperkinesia.

180

181 **Treatment**

182 The owners were instructed to avoid conflict situations by walking the dog at the least
183 crowded/busy hours and places, and to never reinforce nor punish the dog if these situations
184 were to occur. They were also instructed to reinforce calm states by giving treats in these
185 situations (e.g., when the dog was lying on his bed), and to increase both play and exercise, in
186 order to give the dog stimulation according to his breed and age. In addition, obedience
187 training was started in order to teach the dog desirable behaviors and to develop self-control,
188 while improving the relationship and communication between the dog and his owners. Once
189 obedience exercises were well established, a desensitization program combined with
190 counterconditioning to unknown people and different stimuli could be started. On top of the
191 previous measures, owners were recommended to maintain the use of a muzzle during walks
192 to avoid pica.

193

194 **Follow-up**

195 Training sessions were carried out in the Veterinary Hospital at Zaragoza University (HVUZ)
196 facilities, allowing for direct observation and monitoring changes in the dogs' behavior across
197 sessions. During these sessions, apart from obedience commands (i.e., "sit", "lie down",

198 “come here” and “stay”), which were rewarded when the dog performed them in a calm way,
199 other relaxing and communication-promoting exercises were explained. For instance, the dog
200 was taught to look at his owners' eyes to get their attention or to obtain a treat, and he was
201 ignored if other behaviors were used.

202

203 During the first indoor session, the dog was observed to have obvious difficulties relaxing and
204 concentrating during exercises whenever minimal distractions occurred, or when continuous
205 food reward was not provided. Despite these difficulties, an improvement was observed
206 during the first month, and the owners were instructed to practice these exercises both at
207 home and in the street. Two months later, they felt the dog had improved at home, but severe
208 difficulties persisted when practicing exercises outdoors, where the dog continued displaying
209 the same behavior. Moreover, the dog had started to show aggression toward other males. At
210 this point, considering previous evidence of positive effects of serotonergic drugs in the
211 management of hyperactivity in dogs, especially when impulse dyscontrol is present (Overall,
212 1997; Lindsay, 2001; Mentzel, 2009; Carter, 2011; Landsberg et al., 2013), treatment with
213 fluoxetine was initiated, at a dose of 30 mg (1 mg/kg, PO, q 24 h). The dose was introduced
214 progressively in order to minimize side effects. Along with pharmacological intervention,
215 castration was carried out in order to avoid the effects of sexual hormones in sexually
216 dimorphic behaviors (Horwitz, 2007), including intrasexual aggression and mounting.

217

218 Two months later, the owners felt the dog had really improved at home, as he was relaxed for
219 larger periods than before, slept more deeply, and mounting rarely occurred. In the street, they
220 also reported an improvement, as the dog was generally in a much calmer state, and
221 intrasexual aggression had diminished. However, whenever a new stimulus appeared during
222 the walk, he started again pulling on the leash, pouncing upon people, trying to pick up

223 objects from the floor, or chase pigeons. In addition, redirected aggression toward the owners
224 started to appear when they tried to move the dog from those stimuli, and as a consequence,
225 the duration of the walks was shortened, which made the dogs' behavior got worse. Before
226 starting with systematic desensitization sessions, an increase in the fluoxetine dose up to 1.5
227 mg/kg, PO, q 24 h was administered, since higher doses than those normally used for canine
228 aggression (i.e. 1 mg/kg, PO, q 24 h) have been reported for hyperactive dogs (Lindsay, 2001;
229 Mentzel, 2009).

230

231 At that time, under the recommendation of an external dog trainer, the owners started to use a
232 pinch collar which allowed them to walk the dog for longer periods. Although the owners felt
233 more confident with the pinch collar and the dog really benefited from outside exercise, he
234 started to whine and lick his limbs and flank when corrected with the collar, which could be
235 considered as stress or anxiety signs (Overall, 1997; Lindsay, 2001; Horwitz and Neilson,
236 2007). After explaining to the owners the disadvantages of using a pinch collar, exercises of
237 progressive approaching (desensitization) to unfamiliar people were practiced during outside
238 training sessions. From then on, a notable improvement of the dog's behavior in the street was
239 apperceived.

240

241 After summer holidays, the owners reported they had interrupted fluoxetine by themselves
242 since they observed the dog was progressively more calm. Tail chasing and licking of limbs
243 and flank had been considerably reduced, becoming only sporadic. At the time of the last
244 consultation, the owners stated they were using the pinch collar on an occasional basis.

245

246 **Summary and discussion**

247 Many owners suspect their puppies are hyperactive, when they are just young underexercised
248 dogs. Thus, the diagnosis sometimes is conditioned by the owners' expectative of a normal
249 puppy's behavior. However, in the present case, a real hyperactive dog was attended, with
250 obvious symptoms of pica, impulse-control problems, increased excitability, destructiveness,
251 attention deficits and inability to relax (Hart and Hart, 1985; Overall, 1997; Lindsay, 2001;
252 Landsberg et al., 2003; Horwitz and Neilson, 2007). At the first visit, the dog was only 9
253 months old, and at the same time the treatment was getting established, the dog was growing
254 up. The effect of the age in hyperactive dogs has been described before, as some authors
255 affirm that this syndrome is mostly observed in young animals (Horwitz and Neilson, 2007;
256 Landsberg, 2013). Despite this fact, it is difficult to assume that the improvement of the dogs'
257 behavior only relied in his growth, but with a combination of pharmacological and
258 management measures.

259

260 Hunting dog breeds, such as Weimaraners, have been suggested to be predisposed breeds for
261 canine hyperactivity (Hart and Hart, 1985; Overall, 1997; Beaver, 1999; Lindsay, 2001,
262 Landsberg et al., 2003; Horwitz and Neilson, 2007). As hunting dogs, they have an excessive
263 amount of energy that requires a good outlet, and lack of exercise can be one of the
264 contributing factors.

265

266 Excessively active dogs presenting signs of impulse-control problems and other relevant
267 symptoms (e.g., attention deficits, inability to calm down, aggressiveness, and impaired
268 learning abilities) should be evaluated for hyperactivity and possible hyperkinesis syndrome
269 (Lindsay, 2001). In the present case, the interruption of the CNS-stimulant-response test
270 before a higher dose could be administered did not allow for a clear response to CNS-
271 stimulants and, therefore, the test results were not conclusive. Nevertheless, the absence of

272 paradoxical effects, the normality of the vital signs and the positive evolution of the patient
273 without the administration of CNS-stimulants, allowed the clinicians to rule out the
274 hyperkinesia in this dog. A recent study revealed the inability of the CNS-stimulant test as a
275 tool for the diagnosis of hyperkinesia in dogs (Stiles, 2011). In this study, Beagle dogs did not
276 display any significant changes in body temperature, motor activity, and certain specific
277 behaviors such as “lip-licking,” “panting,” and “yawning” within 90 minutes of receiving
278 an oral dose of 0.2 mg/kg of dextroamphetamine. The heart rate of those studied Beagle dogs
279 was significantly reduced with treatment as is seen in a paradoxical response indicating that a
280 low dose oral dextroamphetamine challenge test may in fact identify more than only truly
281 hyperkinetic dogs. On the other hand, a negative test for hyperkinesia cannot be taken as an
282 indication that the dog is physiologically normal. Some cases of hyperactivity seem to involve
283 imbalances in neurotransmitters other than dopamine (Luescher, 1993). Fluoxetine partially
284 improved the dogs’ symptoms, especially at home, which may indicate that, as previous
285 studies suggest, serotonergic system is involved in hyperactivity control (Lindsay, 2001;
286 Luescher, 1993). In order to introduce a new method for studying behavior problems related
287 to attention skills and the levels of activity/impulsivity in pet dogs, a 13-item rating scale
288 questionnaire has been developed for dog owners to measure attention deficit and activity-
289 impulsivity in their dogs as well as its validity and reliability (Vas et al., 2007). The inclusion
290 of most of its questions in our behavioral questionnaire and the limitations of the test (it does
291 not test for different raters other than the owners) were the main reasons why it was not
292 performed in this case.

293

294 Recent studies have reported no adverse effects in dogs following the oral administration of 1-
295 3 mg/kg of methylphenidate in healthy Beagles, apart from mild hyperkinesia (Lavy, 2010).
296 Nevertheless, alopecia, anorexia and pyrexia are described as frequent side effects of

297 methylphenidate in humans. Similarly, hair loss, anorexia and perception of hyperthermia in
298 this dog could also have been considered as side effects.

299

300 Apart from difficulties in diagnosis, the management of dogs showing hyperactivity is
301 complex. Thus, hyperactive dogs are often exposed to routine isolation due to their behavioral
302 excesses, which points to another set of contributing factors underlying hyperactivity:
303 inadequate social attention, insufficient or irregular exercise, and excessive confinement.
304 Active dogs subjected to daily confinement tend to become increasingly hyperactive and
305 solicitous of attention. The situation is a vicious circle, with excessive behavior resulting in
306 further rejection and isolation, thereby generating more attention-seeking behavior and
307 hyperactivity (Lindsay, 2001). The case reported here may be representative of such a vicious
308 circle. The increase of physical exercise and the desensitization sessions would be the real
309 cause of the dog's positive evolution and the reason why he got a stable situation even once
310 fluoxetine was removed.

311

312 Finally, it is important to mention the relationship between medical and no medical causes in
313 the development of hyperactivity in dogs. For instance, food allergies have been previously
314 related to excess activity in dogs (Beaver, 1999). In this case, the coexistence of a behavioral
315 problem (hyperactivity with pica) and a medical condition (food intolerance) reveals the
316 importance of managing both carefully with the objective of having a result. As both
317 conditions can affect each other, the solution of the problem will be held by considering a
318 mixed therapeutic approach.

319

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323 **References:**

324 Beaver, B.V., 1999. Canine locomotive Behavior. In: Canine Behavior: A Guide for
325 Veterinarians. Saunders, Philadelphia, pp. 305-306.

326 Carter, G, 2011. Animal Behavior Case of the Month. J Am Vet Med Assoc 239, 1300-1302.

327 Hart, B.L., Hart, L.A., 1985. Activity, Barking, and Destructiveness Problems in Dogs. In:

328 Hart, B.L., Hart, L.A., Canine and Feline Behavioral Therapy, Williams and Wilkins,

329 Philadelphia, pp. 70-72.

330 Horwitz, F., Neilson, J., 2007. Blackwell's five-minute veterinary consult, clinical

331 companion, canine and feline behavior, Blackwell Publishing, Ames, Iowa, pp. 310-319,

332 337-344.

333 Landsberg, G., Hunthausen, W., Ackerman, L., 2003. Handbook of behavior problems of the

334 dog and cat, Saunders, Philadelphia, Pensilvania, pp. 146, 246-247, 319-321.

335 Landsberg, G., Hunthausen, W., Ackerman, L., 2013. Behavior problems of the dog & cat,

336 Saunders Elsevier, Philadelphia, Pensilvania, pp. 246-247, 351-352.

337 Lavy, E., Prise, U., Soldani, G., Neri, D., Brandriss, N., Bar Chaim, A., Giorgi, M., 2011.

338 Pharmacokinetics of methylphenidate after oral administration of immediate and sustained-

339 release preparations in Beagle dogs. The Veterinary Journal 189, 336-340.

340 Lindsay, S. R., 2001. Handbook of Applied Dog Behavior and Training, Vol 2: Etiology and

341 Assessment of Behavior Problems, Iowa State University Press, Ames, Iowa, pp. 79-81,147-

342 159.

343 Luescher, U. A., 1993. Hyperkinesis in dogs: Six case reports.

344 Mentzel, R. E., 2009. Hiperactividad canina, in Proceedings. 34th World Small Animal

345 Veterinary Congress WSAVA.

346 Overall, K.L., 1997. Clinical behavioral medicine for small animals, Mosby, St Louis, pp.
347 215, 269-270, 513.

348 Overall, K.L., 2013. Manual of Clinical behavioral medicine for dogs and cats, Mosby, St
349 Louis, pp. 285-295.

350 Stiles, E. K., Palestrini, C., Beauchamp, G., Frank, D, 2011. Physiological and behavioral
351 effects of dextroamphetamine on Beagle dogs. *Journal of Veterinary Behavior* 6, 328-336.

352 Vas, J., Topál, J., Péch, E., Miklosi, A., 2007. Measuring attention deficit and activity in dogs:
353 a new application and validation of a human ADHD questionnaire. *Appl. Anim. Behav. Sci.*
354 103, 105-117.

355 Voith, V.L., 1980. Hyperactivity and hyperkinesis. *Mod Vet Pract* 61, 787-789.

356 Westgarth, C., Reeve, K., Barclay, R., 2012. Association between prospective owner
357 viewing of the parents of a puppy and later referral for behavioral problems. *Veterinary*
358 *Record* 20, 517-521.

359