Critically Appraised Topic **Gagandeep Munday**

CAT: Your patient is a 5 year old with autism. His mother wants to know whether there's any evidence that getting a therapy dog might help him.
PICO: In children with autism, what is the effect of therapy dogs on beneficial behavior compared with patients without therapy dogs?

Population: Children with autism

Intervention: Therapy Dog

Comparative: No Therapy Dog

Outcome: Benefits for patients with autism
Databases - Search results: 6
Pubmed, NCBI, The New England Journal of Medicine, York College One Search, Google Scholar, PLOS, Journal of School Health, Embase, Medline, Cochrane Library, CINAHL Plus– Autism, Children, Dogs*, therapy*, education*, exercise* stress*, pet

Author; reference	Level of Evidence	Patient group/ Data collection	Primary and Secondary Outcomes	Key Findings	Limitations/ Bias
Viau, Robert, et al	Cohort	42 children diagnosed with ASD, 7.1 +/- 3.1 years old (ranging from 3.6 to 14.8 years). All dogs received proper training and behavioral evaluation. The study consisted of three experimental conditions, during which the child's behavioral parameters and basal salivary cortisol levels were measured at various times during the day. These three phases consisted of a two-week period prior to the introduction of the dog to the family (PRE), followed by four weeks with the dog (DOG), and two weeks after the dog had been removed from the family (POST). During each of these three phases, an 11-item questionnaire was distributed to parents to assess changes in their child's behavior. Salivary cortisol was collected with a salivette. Radioimmunoassays for salivary cortisol concentrations were performed.Basal cortisol levels were measured once weekly (on the same day), three times a day: upon awakening, 30 min after awakening (CAR), and at bedtime.	Primary: Salivary Cortisol Levels before, during the introduction of a therapy dog, and for 2 weeks after its removal from the family Secondary: Weekly questionnaire evaluation by parents	• The basal cortisol levels of these children did not differ according to their diagnostic group, their gender, or the structure of their family (one-way ANOVA, all $p > 0.05$). • Information from questionnaires completed by parents suggests that children reacted positively to service dogs, as the number of problematic behaviors reported by parents decreased after the introduction of the dogs • The introduction of service dogs had a significant effect on the CAR of autistic children reducing it from a 58% increase prior to the introduction of the service dogs to 10%. • Anecdotal data from the parents questionnaires indicated that the presence of the service dogs might have encouraged improved sleep. • Frequency of problematic behaviors reported by parents decreased when service dogs were present. This effect persisted when the dogs were removed from the family for two weeks	• While the data is suggestive of the possibility of improving sleeping patterns and CAR, it is not indicative of any direct positive behavioral changes from the introduction of dog therapy. • Questionnaires from parents offered qualitative but anecdotal data that is unreliable, and is hindered by biases. Unbiased evaluation from a third-party may be more appropriate.

Protopopova, Alexandra, et al.	Case Study	Participants were 5 children aged 7-11 who were given the option to complete acts of leisure or complete work. The experimenters conducted 30-min sessions with each participant once per day, 2 to 3 days per week. Multiple observers collected data on four behavioral and one biological dependent variables: (1) preference ranking from assessment, (2) correct responses academic task, (3) engagement in task before and after therapy dog, (4) proportion of intervals with problematic behavior, positive affect, and social behavior (5) salivary cortisol concentration before and after each task	Primary: Tasks completed Secondary: Salivary cortisol levels	• The dog functioned as a reinforcer for responding on academic tasks for the majority (four of five) of the participants • Only one of the participants engaged in a higher rate of academic response when the dog was present throughout the session compared to baseline. • Cortisol data suggested that educational sessions during this study were not generally stressful • Researchers suggest that Instead of functioning as a reinforcer, the dog either increased the reinforcing efficacy of praise or reduced the aversiveness of the academic task	• Limited sample size • Relied on parents report of ASD rather than confirmed diagnoses • Unclear whether other incentives were present that
Burgoyne, Louise, et al	Cross-sectional study	This study was based in the primary care setting, within the context of a specific accredited assistance dog centre in Ireland. A total of 134 parents/guardians with an assistance dogs, and 87 parents of children on the waiting list were surveyed.	The primary outcome measured environmental hazards The secondary outcome measured caregiver strain	• Parents/guardians of children who have ASD and an assistance dog rate their child as significantly safer from environmental dangers ($p<0.001$), perceive that the public act more respectfully and responsibly towards their child ($p<0.001$) and feel more competent about managing their child ($p=0.023$) compared with parents on the waiting list. • There was a concentration of positive feeling towards assistance dog interventions with particular focus on safety and comfort for children, and a sense of freedom from family restrictions associated with ASD. The amount of dedication and commitment required to care for a dog were viewed as the primary constraints. • Researchers suggest that assistance dogs can provide parents/guardians with a higher sense of competence with regard to managing their child	• The researchers utilized questionnaires and itemized the results into themes and categories. Data might be tailored to coincide with theory. Perceptions from parents could be fueled by preconceived notions about therapy dogs. • Sample size is small
Obrusnikova, Iva, and Janice Bibik	Case Study	A sample of 4 boys with Asperger syndrome, ages 9 to 11 years old, was recruited from a community agency. The exercise was completed with and without a therapy dog and consisted of 4 fitness stations and 2 skill stations.	Primary: Performance on exercise task Secondary: Condition by dog therapy	• The results show that regardless of the order of the intervention, the average performance was larger for the therapy-dog condition compared with the peer condition. • These findings were confirmed in semi structured individual interviews with the children's parents and instructors.	• Limited and small sample Size • Ignores extrinsic variables, such baseline activity level (with or without dog) and other medical conditions • Data is collected on isolated incidents and needs to further explored in a more long-term trial

Hall, S, et al	Cohort	36 participants participated in the studies on a voluntary basis. Of which 22 were in the intervention group and 14 in the control group. This is including a confirmed diagnosis of autism spectrum disorder and was aged between 3-16 years. The researchers used a variety of generalized scales to assess the external factors of family functionality, parenting stress, and attachment to the dog. They had varying success in participants completing these scaled assessments.	Primary: Effect of dogs on improving family functioning Secondary: Effect of dogs on parenting stress	• Significantly reduced family difficulties (increased family strengths) were observed in families who acquired a pet dog compared to families who did not acquire a pet dog, indicating that improved family functioning was maintained 2.5 years later • Families in the control group experienced a fluctuation in family functioning over the study period, whereas families in the intervention group experienced steady, gradual reductions in family difficulties. • Parenting stress scores revealed trends to a greater reduction in parenting stress (total stress, parental distress, parent-child dysfunctional interactions, and difficult child) in the intervention group compared to the control group.	• Focused more on the parent and referred to indirect benefits to a child with ASD. • Small sample size, with almost 50% participation rate • In regards to the effects on ASD children, the researchers relied on reports from parents rather than conducting unbiased third party evaluations.

Conclusion

Viau, Robert, et al	The introduction of service dogs had a significant effect on the CAR of autistic children reducing it from a 58% increase prior to the introduction of the service dogs to 10%.
Protopopova, Alexandra, et al.	Researchers suggest that instead of functioning as a reinforcer, the dog either increased the reinforcing efficacy of praise or reduced the aversiveness of the academic task
Burgoyne, Louise, et al	Researchers suggest that assistance dogs can provide parents/guardians with a higher sense of competence with regard to managing their child
Obrusnikova, Iva, and Janice Bibik	Regardless of the order of the intervention, the average performance was higher if the therapy dog was involved.
Hall, S, et a	Significantly reduced family difficulties in dealing with ASD were observed in families who acquired a dog compared to families who did not acquire a dog.
Therapy dogs offer a slew of benefits for ASD children. It reduces dysfunctions that the child experiences, decreases their challenges in completing tasks, and minimizes the stresses placed on families raising ASD children. In addition to reducing stressful mornings and improving family dynamics, therapy dogs served as an effective positive reinforcer in many aspects. This positive reinforcement was present during exercise performance and during academic tasks.	

Bottom Line and Clinical Relevance

These studies had many strengths as well as some weaknesses. They are not well designed systemic reviews, but such a feat is understandably difficult given the nature of ASD and limited size of appropriately diagnosed populations. Many of these studies had a small sample size. Each of these studies provide great detail on how they procured their studies and how potential biases were limited. This was true for all but one study by Hall et, which might contain possible biases because it relied on reports from parents rather than conducting unbiased third party evaluations. In addition, the case study on exercise by Obrusnikova, Iva, and Janice Bibik could benefit from a long-term trial. Nonetheless, because of the degree of evidence presented in these journals, their capability of studying a small subset population, and because they were published from respectable journals, I am confident in the claims I make in my clinical bottom line. The findings discussed in these articles are clinically significant. I would tell the mother of the 5 year old child with autism that there is evidence of dog therapy being beneficial for her son. Therapy dogs offer a slew of benefits for ASD children. Studies focused on the dysfunctions that the child experiences, their challenges in completing tasks, and the stresses placed on families. Involvement of dog therapy for 4 weeks has been shown to reduce post awakening salivary cortisol levels leading to less stressful mornings. Measuring salivary cortisol level during academic tasks indicated that while these tasks were not necessarily stressful, the therapy dog served an effective positive reinforcer. This positive reinforcement was present during exercise performance as well, indicating that therapy dogs will help children with ASD be more active. Overall in regards to family dynamics, therapy dogs minimize stressful situations and improve family dynamics. This creates a more positive environment for the child with ASD. All these findings are based on a limited number of studies. It is still unclear whether all children with ASD would benefit from dog therapy. More research is needed.

References

1. Protopopova, Alexandra, et al. “Comparison of Contingent and Noncontingent Access to Therapy Dogs during Academic Tasks in Children with Autism Spectrum Disorder.” Journal of Applied Behavior Analysis, vol. 53, no. 2, 2020, pp. 811–834.
2. Hall, S, et al. “The Long-Term Benefits of Dog Ownership in Families with Children with Autism.” Journal of Veterinary Behavior: Clinical Applications and Research, vol. 13, 2016, pp. 46–54.
3. Burgoyne, Louise, et al. “Parents’ Perspectives on the Value of Assistance Dogs for Children with Autism Spectrum Disorder: a Cross-Sectional Study.” *BMJ Open*, vol. 4, no. 6, 2014, p. E004786.
4. Obrusnikova, Iva, and Janice Bibik. “Effects of Canines on Physical Activity of Children With Autism.” Research Quarterly for Exercise and Sport, vol. 85, no. S1, 2014, p. A82.
5. Viau, Robert, et al. “Effect of Service Dogs on Salivary Cortisol Secretion in Autistic Children.” Psychoneuroendocrinology, vol. 35, no. 8, 2010, pp. 1187–1193.