

The Role of Dogs as a Therapeutic Intervention in Animal Assisted Therapy

Author

Carl M. Harper, M.D.
Instructor, Harvard
Medical School
Department of Orthopedic
Surgery
Division of Hand & Upper
Extremity Surgery
Office: 617-667-7673
Fax: 617-667-2155
330 Brookline Ave, St10
Boston, MA 02215
Email:
charper@bidmc.harvard.edu
[u](#)

Abstract

Animal Assisted Therapy (AAT) has been employed for hundreds of years. Over the last century AAT has been shown to be efficacious as an adjunctive treatment modality for a wide range of pathophysiology. The most common animal employed in AAT is the dog. Those animals that are specifically trained for a role in AAT are termed “therapy dogs”. From the treatment of acutely psychotic psychiatric patients to patients recovery from total joint arthroplasty AAT has shown itself to be a useful clinical tool. The biochemical basis for the success of AAT lays in its effect on several neuroactive peptides including oxytocin and Beta endorphin. Numerous studies have shown not only an increase in oxytocin levels in the subjects receiving AAT but also the therapeutic animals themselves indicating the filiative nature of AAT. As more Level I studies are performed investing its’ potential role across varied pathophysiology we expect AAT to become ever more integrated into the practice of medicine in the future.

Keywords: Animal Assisted Therapy, Therapy Dog, Pet Therapy

1. History

The first documented use of animals in therapeutic setting occurred in Gheel Belgium in the 9th century (p7,2). In the town of Gheel, handicapped members of society were encouraged to work with livestock as part of their recuperation following a wide range of pathology from illness to significant trauma. The thought process behind the interaction was that by removing people from a convalescence house and integrating them back into the natural environment they would experience a faster and more complete recovery.¹ The first published use of animals for treatment of the mentally ill comes from England in 1796. A public scandal occurred in which several members of the Quaker faith perished in institutions for the mentally ill. When the condition of these institutions was investigated, it was discovered that not only were patients living in squalor but the treatment that they received on the part of their caretakers was nothing short of brutal. As a result, a wealthy Quaker merchant named William Tuke opened the York Retreat which treated the mentally ill with an entirely new regimen. This new treatment philosophy involved allowing freedom of movement, autonomy and interaction with small animals.² This facility was extremely successful with the institution lasting for over a century.

The US Army began to employ therapy dogs in the treatment of soldiers diagnosed with “operational fatigue” i.e. PTSD at the Army Air Corps Recovery Hospital in Pawling New York during World War II (p19).¹ At this facility patients interacted

with livestock in a bucolic setting, similar to the patients in Gheel. Physicians believed that by returning to a natural environment, augmented by the presence of animals, patients would experience an accelerated and more seamless integration back into society. The first modern use of animals as a true therapeutic modality came in 1962 with the work of Levinson. Working as a child psychiatrist Levinson noted that his patients were markedly different when they were interviewed in the presence of his dog Jingles. In his initial work Levinson noted that this discovery occurred by happenstance. A patient arrived for their appointment well after the scheduled time and was presented to Dr. Levinson while he was in his office (with the dog). Levinson noted the ease with which he was able to interact and treat the child in the presence of the dog as compared to their standard meetings. . He went on to study this concept of animal assisted therapy in detail, authoring many of the early works on the subject.³

The last quarter of a century has seen a marked increase in the use of animals, especially dogs, in a therapeutic capacity. Starting with Levinson’s seminal work and extending into the first formal studies of the impact of animal assisted therapy on the mentally ill, dogs have been shown to be able to affect significant change in both social interaction and emotional well-being.⁴ In an effort to meet the needs and standardize a growing field two groups were formed to train both dogs and handlers in field of animal assisted therapy and therapeutic intervention. Therapy Dogs International was founded in 1976 by Elaine

Smith and a year later the Delta Foundation was formed in 1977 (later became Delta Society in 1981) with the express goal of standardizing training and ensuring the quality of therapy dogs and their handlers.^{5,6}

2. Definitions

With the increased use of animals in a “helping” role it has become necessary to create definitions for various types of interaction. The type of interactions discussed in this article, and indeed any interaction in which an animal is being used as a clinical intervention is termed “Animal Assisted Therapy” or AAT. Animal-assisted therapy is defined by the American Veterinary Medical Association as “a goal-directed intervention in which an animal, meeting specific criteria, is an integral part of the treatment process”.⁷ As this article is dedicated to the discussion of dogs in a therapeutic capacity, the two main categories in which dogs interact with people are the following: service dog vs. therapy dog.

A service dog is “any dog that is individually trained to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability....The work or tasks performed by a service animal must be directly related to the handler’s disability”⁸ The is in direct contrast to a therapy dog which is defined as “..a dog that, with a handler, visits individuals or groups to provide some relief from an institution, such as a hospital, or condition, such as cerebral palsy or Alzheimer’s. Therapy dogs may be used

one-on-one as part of a treatment program for an individual, which is often called animal assisted therapy (abbreviated AAT), but mostly therapy dogs in the United States today visit facilities to help or at least cheer up the populations of those facilities.”(p12)⁹ The primary focus of this article is investigating the role and efficacy of therapy dogs performing AAT

3. Biochemical mechanism for efficacy

Prior to discussion of the literature concerning the efficacy and utility of therapy dogs it is important to first evaluate the mechanism of action by which AAT has been proposed to function. Understanding the neurochemical pathways that are impacted during AAT grounds the work in a factual biochemical basis which is often lost when discussing its often subject benefits. The serum levels of oxytocin, dopamine, prolactin, β endorphins and cortisol have been shown to be impacted during AAT. These hormones all function to modulate the body’s stress response, with increased levels of oxytocin, dopamine, prolactin and β endorphins corresponding to subjective feelings of relaxation and calm while increased levels of cortisol correlate with a heightened stress and anxiety response.^{10,11} In addition, oxytocin has also been shown to modulate the perception of pain and sleep in human subjects, with increased levels of oxytocin corresponding to decreases in patient’s pain as well as improvements in sleep quality and feelings of restfulness.^{12,13} The neurochemical impact of interaction with a therapy dog was first shown by Odendaal and Meintjes, demonstrating that dog affiliative behavior (quiet play with the

dog involving talking, stroking, and petting the dog) produced a significant increase in beta endorphin (3.1 to 8.0 pmol/L), oxytocin (2.1 to 4.0 ng/L), prolactin (9.2 to 11.6 ng/L), and dopamine (86.5 to 107.0 pg/L), and a corresponding decrease in serum cortisol (317 to 309 mmol/L). The most profound effect seen was the doubling of serum oxytocin (2.1 to 4.0 ng/L $p < 0.01$) levels in the human following the interaction.¹⁴ More recently a significant increase in serum oxytocin in both dog and owner after 15 minutes of friendly interaction has been shown with a corresponding decrease in the heart rate of their owners.¹⁵

More recently, studies have been performed to evaluate the neurophysiologic impact of dogs in a non-clinical setting. An exploratory study designed to assess autonomic, endocrine, and neurophysiologic stress indicators in a small group of healthy adult dog owners interacting with their own or an unfamiliar therapy dog following a mental stress task reported consistent patterns of relaxation. Serum cortisol decreased, heart rate blood and pressure decreased, and self-reported anxiety and stress response improved.¹⁶ These findings are mirrored by the work of Barker and colleagues who reported reduced salivary (0.177 to 0.155 ug/dl $p=0.004$) and serum (12.3 to 10.7 ug/dl $p < 0.001$) cortisol in healthcare professionals, in the absence of a stress task, following as little as 5 minutes of AAT.¹⁷ The positive benefits of the presence of a dog outside of a clinical or therapeutic intervention have also been demonstrated. Allen showed that in studying 45 female dog owners completing a mental stress task with

their dog, close friend, or alone, showed little or no cardiovascular stress reactivity during the task with the dog present, but significantly increased activity with the close friend present.¹⁸ A study of 240 pet-owning and non-pet-owning married couples, pet (dog or cat) owners had lower resting heart rate (HR) and systolic and diastolic blood pressure (SBP and DBP); showed less HR, SBP, and DBP reactivity during psychological and physiological stress tasks; and showed faster return to baseline than non-pet owners. For pet owners, the lowest physiological reactivity and the quickest return to baseline occurred when the pet was present, compared with when a spouse or friend was present.¹⁹ This work is mirrored by other authors who have shown pet presence to be associated with lower blood pressure during a stressful task for older hypertensive adults, and reduced HR and mean arterial pressure in a sample of normotensive adults who completed mental stressors.²⁰ Allen and colleagues randomly assigned hypertensive stock brokers starting angiotensin-converting enzyme (ACE) inhibitor therapy to acquire a pet or to a 6-month wait list control condition. Pet owners showed higher performance on a mental task and lower physiological reactivity (heart rate, blood pressure, and renin activity) than those in the control condition. The ACE inhibitor therapy significantly reduced only resting blood pressure.²¹

4. Civilian Population

Canine AAT has been shown to have wide ranging applicability in both the inpatient and outpatient setting crossing

many specialties with varied pathophysiology. We will begin our discussion with the use of AAT in the inpatient setting with patient's recovery from non-psychiatric conditions. In one of the first randomized controlled trials employing AAT, 76 patients hospitalized for heart failure (non-operative) were randomly assigned to one of the 3 groups (usual treatment, AAT, & volunteer). The impact of the intervention was measured comparing physiological and self-reported measures of anxiety. The researchers found that compared to the volunteer only group, significant decreases in epinephrine (-15.86 pg/mL, $p=0.04$) and norepinephrine (-240.14 pg/mL, $p=0.02$) levels were measured both during and after AAT. There was also a significantly greater decrease in reported anxiety for the AAT group compared with those who received the 12-minute volunteer visit. A significant decrease in systolic pulmonary artery pressure (-4.32 mmHg, $p=0.03$) & -5.78 mmHg, $p=0.001$) and pulmonary capillary wedge pressure (-2.74 mmHg, $p=0.01$ & -4.31 mmHg, $p=0.001$) both during (8 minutes) and after (16 minutes) the AAT visit was present compared with the other 2 study groups.²² In a hybridized intervention combining AAT and an early ambulation program 69 hospitalized cardiac patients were prompted to ambulate by a restorative aide. If the patients refused, they were approached a second time with the proposal of ambulating while accompanied by a therapy dog. To prevent bias from study effects, consent to have the individual's data be included was obtained after the ambulatory activity or after the patient's second refusal. Distance

ambulated (in steps) was calculated by pedometer, and patient satisfaction with AAT was measured by a Likert scale survey composed of 5 items. As compared to a stratified historical sample of which 28% of patients refused ambulation, only 7.2% of the study sample refused ambulation completely. Moreover, 18.9% of the experimental group patients reversed their initial refusal to ambulate when given the opportunity to participate in AAT. Those that engaged in AAT walked nearly twice as many steps (120.02 vs. 235.05 steps, $p<0.001$) as the ambulating patients in the historical group. Self-report data indicated that the participating patients were satisfied with AAT experience.²³

Therapy dogs have also been employed in the oncologic population. Despite early critics' concerns over zoonotic infections no case reports exist of a patient developing an infection secondary to interaction with a therapy dog. In evaluating patients presenting for an outpatient administration of chemotherapy a three phase study was developed in which the AAT session was divided into three 20-minute segments involving patients watching the dog exercise with the handler, playing with the dog, and feeding or holding the dog. Self-reported measures of anxiety, depression, somatic symptoms, and aggression were collected as well as heart rate, arterial oxygen saturation, and blood pressure. Unlike the controls, patients in the AAT group demonstrated a significant decrease in depression and increase in arterial oxygen saturation. Significant reductions in anxiety, aggression, and blood pressure were also reported however no group differences were

noted.²⁴ Another study investigated mood and self-perceived physical and emotional health prior to radiation treatments. AAT visits were compared to volunteer visits and reading group visits that were all 15 minutes in duration, 3 times a week for 4 weeks. Changes in mood (assessed before the first and after the last session) were compared within and between groups. No significant differences were found for any of the subscales, however, trends of decreased anxiety and improved emotional health were reported. The lack of significant changes within and between groups may be due in part to the small sample size (n=10 for each group), disease progression, or time of assessment. An exit survey revealed that some patients in all groups rated the intervention as helpful and the majority indicated they would recommend it to another patient.²⁵

AAT has recently been evaluated as a post-operative modality to augment rehabilitation. The only randomized controlled trial to date involving post-operative patients investigated 72 patients undergoing primary unilateral total hip or total knee arthroplasty. Patients were randomized to a 15-minute visitation with a therapy dog before physical therapy or standard postoperative physical therapy regimens. Patients in the treatment group had lower VAS scores after each physical therapy session with a final VAS score difference of 2.4 units versus control VAS, 4.1 (p<0.001). Patients also had significantly higher HCAHPS scores and rated the hospital significantly higher than those patients who did not receive AAT (p<0.001).²⁶

Although AAT has been shown to be efficacious in augmenting treatment of non-psychiatric conditions by far the greatest body of literature exists evaluating AAT's ability to modify or augment treatment of psychiatric conditions. AAT has been employed in the acute setting for hospitalized patients with a psychiatric illness as well as the outpatient setting. In one of the largest studies evaluating the effect of AAT on acute psychiatric inpatients, 231 patients participating in a single session of traditional recreational therapy (RT) and RT incorporating a therapy dog were compared. The investigators found a significant reduction in anxiety following both conditions but a significantly stronger effect was seen in the group that incorporated the therapy dog. The average decrease in the number of patients demonstrating psychotic disorders was ~10% (p=0.006), mood disorders was ~8% (p=0.01) and "other" disorders 6% (p=0.026). Only the patients with primary substance abuse disorders showed no significant change in anxiety, under either condition, perhaps due to their acute stage of physiological withdrawal.²⁷ In a similar study investigators evaluated the effect of 4 weeks of AAT on 69 hospitalized psychiatric patients and reported increased social behaviors and responsiveness to surroundings in the AAT group compared with a control group. Lastly, a study involving elderly schizophrenic patients residing in long-term care facilities also reported benefits after 12 months of weekly AAT. Those in the AAT group had significant improvement in social functioning compared with the control group

as assessed via the SAFE score (24.5 to 11.2, $p < 0.01$). In point of fact, the AAT group was the only group shown to demonstrate any statistically significant improvement.²⁸

In the outpatient setting AAT has been shown to have equal efficacy. A study was performed comparing a single 15 minute session of AAT with a therapy dog to 15 minutes of reading/looking through magazines with respect anxiety, fear, and depression. A significant 37% reduction in fear and 18% reduction in anxiety were found in the AAT group ($p < 0.05$). Although no significant differences were found for anxiety or depression, the majority of patients reported on a post intervention interview that they believed AAT reduced their anxiety and depression.²⁹ Including AAT in occupational therapy groups has been shown to significantly improve group attendance and attracted isolated individuals to the group regardless of diagnosis.³⁰ Recently a large meta-analysis was performed focusing on studies that included randomization, a control or comparison condition, and self-report measure of depression. The authors reported a significant, medium effect size based on 5 studies meeting their inclusion criteria, concluding that standard intervention augmented by AAT is associated with fewer depressive symptoms when compared to standard therapy alone.³¹

5. Military Application

Since the early 20th century AAT has been embraced by the United States military. This should come as no surprise given that both the Army and Navy have a

long history of utilizing animals to achieve tactical goals. The Army employed carrier pigeons as recently as World War I to transfer vital information such as troop movements and other reconnaissance. The Navy has employed a host of animals from seals to dolphins and beluga whales to carry out some of its missions involving deep water operations. The modern US military currently incorporates AAT into a wide variety of interventional modalities from therapy dogs embedded with combat units during their “reset period” to recovery from PTSD once soldiers have resumed non-combat activities.

The benefit of the presence of animals, particularly dogs, amongst combat units has long been recognized and if not actively encouraged, at least tacitly permitted by the US Army. From General George A. Custer who had as many as four dogs with him as part of his entourage during his final campaign to General Dwight D. Eisenhower whose Scottish terriers served as mascots for his general staff, the role of the dog and its function as esprit de corps for soldiers and generals alike cannot be overstated.³² As early as World War II the US Army Air Force began to employ what we would today refer to as a Therapy Dog at one of the first modern convalescence units in Pawlings New York. The role of this unit was to prepare soldiers to transition back to civilian life in the 1940's.³³ On the opposite end of the proverbial spectrum, therapy dogs have been deployed to front line post in Iraq and Afghanistan working with soldiers who are employed in active combat. While results have not been quantified, general consensus from the occupational therapists

and soldiers is that having a therapy dog present as part of the Operational Stress Control (OSC) Unit was invaluable.³⁴

Perhaps the most impressive component of the military's use and study of therapy dogs is focused on rehabilitating soldiers once they have been removed from active duty. Numerous services are run out of Walter Reed Army Medical Center, the main hospital for troops returning from overseas. While these programs have yet to produce quantifiable data to measure the impact of the intervention, discussion of these programs, if for no other reason than to demonstrate their scope and breadth, is valuable. The first program to be discussed is incorporated within the Military Advanced Training Center (MATC). The goal of the MATC is to evaluate soldiers who have returned from combat having sustained either physical or emotional trauma (the two are not mutually exclusive) and provide a cohesive rehabilitation program to either help them reintegrate with their unit or transition out of active field duty into the care of the Veterans Administration. As part of this rehabilitation process soldiers are offered (provided the physician supervising their care approves) access to a therapy dog/occupational therapist team which will assist them in any and all capacity as they begin their recovery. This aspect of the MATC has been shown to be quite popular amongst soldiers, exemplified by the fact that 42% of soldiers being treated with a spinal injury have inquired about the use of a therapy or assistance dog as part of their recovery.³⁵

After soldiers have been discharged from active duty several programs exist to further ease the transition back to civilian life. The Warrior Transition Brigade Occupational Therapy Work and Education Program (WTBOTWEP) provides soldiers who have been diagnosed with PTSD or a traumatic brain injury (TBI) the opportunity to work with professional therapists and dog handlers to themselves train a therapy dog for another service members. Both patients and therapists have noted that in training the dogs the soldiers' mood, affect and ability to cope with stressful situations have greatly improved. Not only does the relationship with the dog provide a meaningful and therapeutic relationship, but the knowledge that one is performing a service for a fellow service member has been expressed as a large motivating factor by soldiers who have completed the program.³⁶ Along this continuum exist two organizations whose goal is to improve the lives of veterans who have sustained injuries as part of their service. The first group, Canines for Combat Veterans (CCV) seeks to provide wounded veterans of any foreign conflict, past or present, with a service dog tailored to their specific set of disabilities. The service dogs are specifically chosen for the needs of the veteran. The veteran and the dog are then taken to the NEADS training facility where they undergo a 2 week course designed to strengthen their bond and provide high level supervised training to ensure that the relationship between the veteran and animal is strong and secure. The final organization to be discussed is Pets2Vets. Those veterans not physically disabled and/or who do not qualify for CCV have opportunity to acquire

a dog, identified at select shelters and trained to provide a calming presence. This program, based upon basic science data discussed previously which shows a positive health benefit to owning a dog, is designed to integrate families and soldiers together through a common bond over the dog. Not surprisingly, anecdotal evidence shows all of these programs to be extremely efficacious.³⁶

6. Future Directions

While AAT has been shown to be a powerful adjunct to traditional therapy, it has not received a large amount of attention, either in the awareness of the general population or in its employment by healthcare professionals. The reasons for this are varied, but the most obvious is that in order for AAT to be effective, the patient needs to be receptive. Those patients who

have derived benefit from AAT are inherently self-selecting as they have expressed an interest and willingness to interact with the therapy dog. With the limitation understood, we still require a better awareness amongst healthcare providers as to the benefits of AAT and an understanding of the patient populations in whom AAT can be effective. To that end, following the military's lead, AAT could stand to make progress in its incorporation into the civilian medical system. Having experienced bias first hand by hospital regulators in opposition to bringing a therapy dog into the clinical setting, numerous barriers still exist to wide-scale availability of AAT in the inpatient setting. Only by performing more Level I studies exploring the effect of AAT across a wide range of patient populations can we begin to more fully employ it as an adjunctive therapeutic modality.

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