MAYO CLINIC

EDITORIAL

September 2019
Volume 3
Number 3

MAYO CLINIC
PROCEEDINGS

Innovations, Quality & Outcomes

The Human-Canine Bond: A Heart's Best Friend

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Humans have coevolved with dogs, beginning with the domestication of the wolf about 40,000 years ago.[1] Since then, this symbiotic relationship between a human and a dog has favorably affected development bilaterally and intertwined the 2 species. In this issue of *Mayo Clinic Proceedings: Innovations, Quality & Outcomes*, a study by Maugeri et al[2] further strengthens the growing body of evidence indicating dogs' beneficial effect on cardiovascular health (CVH) and overall well-being. The investigators examined 1769 patients from the Kardiovize Brno 2030 study and used a novel metric for CVH based on 7 key health factors emphasized by the American Heart Association. Pet owners reported higher levels of physical activity (PA), better adherence to a heart-healthy diet, higher levels of high-density lipoprotein cholesterol, and lower levels of blood glucose and diabetes. Moreover, PA and diet were even more favorable in dog owners than in owners of other animals. Dog ownership also correlated with a significantly higher overall CVH score compared with either ownership of a noncanine pet or no pet at all.

Experts on the topic have long recommended canine companionship as protection against cardiovascular disease (CVD) because of a dog's tendency to boost its owner's PA and mental health. Research indicates that bringing a dog into the home can improve adherence to an exercise regime, enhance fitness, and reduce visceral adiposity of its human coinhabitants.[3] With CVD being the predominant cause of death worldwide and physical inactivity and overweight/obesity being major risk factors for CVD and premature death and disability, a commitment to regular PA, exercise, and fitness has the potential to substantially improve outcomes.[4] In fact, PA has ameliorating effects on 5 of the 6 leading modifiable risk factors for myocardial infarction, including lipid profiles, stress, diabetes, hypertension, and abdominal obesity, as well as psychological risk factors and psychosocial stress (PSS).[5] Dogs compel their owners to specifically do more outdoor exercise, which may even bolster health benefits further. Recently, a large cross-sectional study found that >120 min/wk spent in a natural outdoor environment was associated with higher reported levels of health and well-being.[6]

Higher levels of PA, exercise, and fitness not only improves CVD outcomes but also curb anxiety, hostility, depression, and emotional distress.[7-9] In addition to increasing their owners' dose of outdoor exercise, dogs reduce PSS levels, aid in the treatment of depression, and act effectively as an anxiolytic intervention.[10,11] There exists a dangerous reciprocal relationship between CVD and mental health whereby PSS is associated with elevated rates of CVD, but CVD also stands as a major risk factor for developing or worsening mental health conditions.[7] The strong emotional bond that typically develops between a human and a dog can bestow powerful therapeutic effects on both mental health and heart health.

A landmark study from Sweden analyzed the effects of dog ownership on CVD death and all-cause mortality in a prospective register-based nationwide cohort of 3,432,153 individuals, with 12 years of follow-up.[12] In single-person households, dog ownership was associated with significantly lower risks of both all-cause mortality and CVD mortality (33% and 36% reductions, respectively). People living in multiple-person

households also benefited from dog ownership with significantly lower risks of all-cause mortality and CVD mortality (11% and 15% reductions, respectively), though the benefits were less impressive than for those living alone.[12]

More evidence of the halo effect of canine companionship on heart health comes from the Cardiac Arrhythmia Suppression Trial,[13] which concluded that high social support and dog ownership were 2 independent predictors of survival 1 year after myocardial infarction. Dog ownership, much like interactive physical play,[14] improves risk factors for both CVD and mental illness in unique multidimensional ways. The human bond with dogs goes beyond emotion and sheds light on the shared evolutionary journey of these 2 species. More so than chimpanzees, our closest genetic relative, and more so than wolves raised in human environments, dogs are uniquely sensitive to human forms of communication and have been proven to understand human intention far better than any other animal.[15,16] The observation suggests that this may be genetically inherent as these abilities are seen in untrained dogs as young as 6 weeks old.[15] Hunting dogs were found to best understand human hand gestures.[16] Similarly, in the Swedish nationwide cohort study, among all the various breeds, hunting dogs (such as retrievers, pointers, and setters) were associated with the lowest risks of CVD death.[12]

Over the past 40,000 years, *Homo sapiens* and *Canis familiaris* have become evolutionarily adapted to fill a niche in each other's environments and that relationship has translated into contemporary health benefits. Currently, the presence of a dog in the home portends a lifestyle shift for the better and is linked to a reduction in PSS levels; improvement in PA, exercise, and fitness levels; and decreased overall CVD burden, producing a true "Dog's Day Heaven."

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Potential Competing Interests: The authors report no competing interests.

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