

Is the Dog a Child's Best Friend?

Será o Cão o Melhor Amigo da Criança?

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RESUMO

Nos últimos anos, tem havido um interesse científico crescente no campo da interação homem-animal, e os resultados têm sugerido vários potenciais benefícios, tanto em adultos como em crianças. Os cães podem desempenhar um papel importante no desenvolvimento social, emocional e cognitivo das crianças. Brincar com o cão pode também contribuir para aumentar a atividade física das crianças melhorando a sua qualidade de vida.

No entanto, é inegável que existem efeitos desfavoráveis ou riscos que devem ser considerados. As preocupações mais frequentemente referidas são alergia, asma e transmissão de doenças zoonóticas. Além disso, riscos tais como agressões e mordeduras também devem ser considerados. Tem estado a ser estudado se a idade de exposição ao cão pode influenciar o risco de doença alérgica, não existindo dados suficientes. Não há evidência que suporte a existência de espécies hipoalergénicas.

O médico deve informar a família de todos os riscos e benefícios associados à posse de um cão, contribuindo para uma decisão parental informada e consciente. É também aconselhável selecionar cuidadosamente o cão, tendo em conta as suas características intrínsecas, nomeadamente a agressividade. Fatores como o tempo diário disponível, espaço adequado, prestadores de cuidados para períodos de ausência e disponibilidade económica também devem ser ponderados.

PALAVRAS-CHAVE: Cães; Criança; Fatores de Risco; Hipersensibilidade; Mordeduras e Picadas; Vínculo Humano-Animal; Zoonoses

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ABSTRACT

In recent years, there has been a growing scientific interest in the field of human-animal interaction, and the results have suggested several potential benefits in both adults and children. Dogs can play an important role in children's social, emotional and cognitive development. Playing with the dog can also contribute to increase children's physical activity, improving their quality of life.

However, it is undeniable that there are unfavorable effects or risks that must be considered. The most frequently mentioned are allergy, asthma and transmission of zoonotic diseases. In addition, risks such as aggression and bites must also be considered. It has been studied whether the age of exposure to the dog can influence the risk of allergic disease, and there are not enough data. There is no evidence to support the existence of hypoallergenic species.

The physician must inform the family of all the risks and benefits associated with owning a dog, contributing to an informed and conscious parental decision. It is also advisable to carefully select the dog, taking into account its intrinsic characteristics, namely aggressiveness. Factors such as available daily time, adequate space, caregivers for periods of absence and economic availability should also be considered.

KEYWORDS: Bites and Stings; Child; Dogs; Human-Animal Bond; Hypersensitivity; Risk Factors; Zoonoses

INTRODUCTION

The Oxford English Dictionary defines a pet as "an animal (typically one which is domestic) kept for pleasure or companionship".¹ The experience of pet ownership exists across many epochs, cultures, and socioeconomic status.² In many occidental countries, more than half (i.e. around 60%) of people live with pets.^{2,3} On average, one third of these households have a dog, making it "man's best friend".³

Pet ownership is associated with a number of physical, mental and social health benefits in both adults and children.^{4,5}

For children, pet ownership is associated with social and emotional development, namely higher self-esteem, autonomy, empathy for others, and decreased feeling of loneliness.^{4,5} Furthermore, several studies report that in children with chronic diseases or disability, pets, namely dogs, may help in their recovery or, at least, improve their quality of life.⁶ However, it is undeniable that there are unfavorable effects and/or risks that should be considered.^{6,7} The challenges of owning a pet may include: cultural norms, finances, veterinary-care expenses, and policies that restrict pets in public or rental housing.⁷ Moreover, untoward events can happen to pets; the death of a pet is obviously detrimental and can have implications in the child's health outcome.⁷ The most common concerns expressed regarding owning a pet are allergies, asthma and transmission of zoonotic diseases. Furthermore, risks such as aggression or bites should also be considered.^{6,7}

In recent years, there has been an increased scientific interest in the field of human-animal interaction,⁸ and the results, as stated above, have suggested several poten-

tial benefits. The benefits and the potential downsides of children interacting with dogs highlight the importance of research on children-animal interaction.

BENEFITS OF DOG OWNERSHIP

CHILD DEVELOPMENT

Owning a dog can impact a child's emotional health, physical health, social and cognitive development. Children are biologically pre-programmed to form emotional attachments with human caregivers.⁵ Growing evidence demonstrates they also can establish these attachments to pets.^{5,8}

Dogs may offer children an affectional bond, special friendship, and a safe-haven.⁵ Moreover, children turn to their pets for comfort, reassurance and emotional support when feeling distressed, angry, or sad.^{6,8} Thus, it is plausible that pets may have the potential to encourage better emotional health, reduce anxiety and depression.^{5,6,8} Pets may also influence cognitive development,^{6,8} by facilitating language acquisition, and potentially enhancing verbal skills.^{6,8,9} Owning a dog has also been associated with positive social outcomes (pet as a social catalyst), such as better relationships with peers and the ability to form friendships and be well-liked; this finding was particularly evident for children without siblings in a recent study.⁴ At a time of an unprecedented rise in childhood obesity and overweight, owning a dog may have other important health benefits, as playing with dogs may increase children's physical activity.^{4,6,9} Therefore, the developmental importance of bonds that children and/or adolescents form with dogs should not be overlooked.⁸

THErapy OR ASSISTANCE DOG

Dogs can play an important role in the therapeutic approach of some pathologies including neurological and neurodevelopmental disorders (for example, autism spectrum disorder).¹⁰ In 1953, the psychiatrist Boris Levinson accidentally discovered that in sessions where his dog was present, children were more attentive and calm.¹⁰ Trained dogs can intervene in memory-learning exercises and also as an affective and motivational stimulus. Its participation, whether passively or actively, reduces the stress of the child and facilitates the attachment. It acts as a mediator between the therapist and the child, increases their interactions, such as, eye contact, smiling, touching and favors socialization.¹⁰

Dogs can also be trained as assistance dogs, helping individuals with disability, such as blind patients, helping in natural disasters or even as part of a security team.

RISKS OF DOG OWNERSHIP

DOG BITES

Animal bites are a common problem worldwide, in the UK it is estimated that dog attack injuries are responsible for an average of 250 000 minor injuries and emergency unit attendances each year and in the United States, two to five million dog bites occur each year.¹¹ Children are bitten more often than adults, in particular, children aged between 5 and 9 years.⁶

Some risk factors for dog attacks referred to in the literature are school-aged children, male, households with dogs, certain breeds and male dogs. Most of the cases involve a known or a family dog.¹¹ Children are especially vulnerable due to their small stature, relatively large size of the head in comparison the body, their willingness to bring their face close to the animal and limited motor skills to provide defense.^{11,12} The head and neck are the most common site of bites in children up to 10 years of age; arms and legs are the usual site of injury for older children and adults. Children under 3 years are more vulnerable to intracranial injuries.^{6,12} Inappropriate behavior is the main cause for bites at home and also the lack of supervision when children are interacting with dogs. Changes in the environment can also be a risk factor, most of bites take place in the spring-summer months, at the end of the day and at weekends.⁶

Dogs usually bite children out of fear, anxiety, predation or competition for means. Most stimuli for aggression in young children are food, laying on the dog and pinching him. In older children it is petting, hugging and kissing the dog.⁶ There are some breeds of dogs that are known for

being more aggressive (Rottweiler, Pitbull, Dobermann, German Shepherd, Siberian Husky, Akita, Australian Shepherd, Bull Terrier, Neapolitan Mastiff, Chow Chow, Tosa Inu, Cane Corso, Burdusian Dogue, Prey Canary, Argentine Dogue, Staffordshire). Male dogs bite more frequently than females. Testosterone is considered to be a behavioral modulator that makes dogs react more intensely.⁶ A dog bite can lead to a range of injuries, including scratches, deep open cuts, puncture wounds, crush injuries, and tearing away of a body part. The most common complication of a dog bite is wound infection, though there is also some risk of zoonosis. Dog bites rarely lead to death.^{6,12}

ZOONOSIS

Zoonotic diseases, or zoonosis, are diseases shared between animals and people. They can be caused by viruses, bacteria, parasites or fungi. Often, the animals that transmit these germs are domestic and look healthy. Zoonosis can be transmitted by the dog through saliva, urine, feces and contaminated secretions or by insect bites. More rarely, transmission can occur through contaminated dog food.⁶ It represents a serious problem of public health, with 75% of the diseases emerging and re-emerging worldwide being zoonosis. Knowing that most zoonoses related to pets are acquired through fecal-oral transmission or by direct contact, small children are at greater risk. The elderly and immunocompromised people are also more likely to acquire these diseases.⁶

AND THE ALLERGIC RISK?

Allergic sensitization is defined as the presence of specific IgE antibodies to an allergen. Allergy is defined as the occurrence of reproducible symptoms or signs initiated by exposure to a defined stimulus at a dose tolerated by nonallergic people and mediated by specific immunologic mechanisms (antibody or cell mediated).¹³

Animals are the third cause of allergic disease.^{14,15} The prevalence of sensitization to dogs and cats varies by country, timing of exposure and predisposition to atopy.¹⁵ In the United States and Europe the prevalence of sensitization to furry animals has increased over the past few decades. Age and sex-adjusted data from a pan-European study published in 2009 found, by using skin prick tests, that 26% and 27% of adults were sensitized to cats and dogs, respectively.¹⁶ The prevalence of sensitization is modified by subject's age, with increasing prevalence throughout childhood culminating in a peak during adolescence.¹³ Due to the increasing number of dogs and cats in the community, in addition to residential environments, exposure to furry animal allergens can occur in schools, occupational and/or leisure environments.¹⁵

However there is insufficient scientific evidence to allow us to predict when sensitization is associated with the development of clinical allergy. Sensitization to dog allergens in childhood has been associated with the development of allergic diseases, in particular, asthma and rhinitis.^{15,17}

DETERMINANTS OF ALLERGIC SENSIBILIZATION

A number of determinants for allergic sensitization to furry animals have been identified, such as the genetic constitution of the exposed subject, the environmental setting, and other environmental exposures, including concomitant exposure to other allergen sources and microorganisms.¹³ Additionally, several determinants directly related to the animal have proved important, namely the biological activity of the allergen and the timing, variability and intensity of the allergen exposure.¹³

TIMING OF ALLERGEN EXPOSURE

Timing of allergen exposure can condition sensitization and allergy risk. Exposure in the first year of life along with other genetic and environmental factors appears to reduce the risk of allergic disease.¹⁸ There is evidence that the mechanism of sensitization in early dog exposure is microorganism-related. The presence of a dog seems to alter the infant's microbiota, through early exposure to a large load of microbial agents and their endotoxins. The presence of certain microorganisms/microbial products influences the type of immune response in the presence of a specific antigen - in this case, protective of allergic disease.¹⁹ However, it is still not known if tolerance induced by early exposure implies continued exposure to the animal over a lifetime.¹⁸ In contrast, exposure after the first year of life seems to be associated with an increased risk of sensitization and the development of allergic disease.²⁰ Further studies are needed to confirm this finding.

CHARACTERIZATION OF DOG ALLERGENS

All dogs produce allergenic proteins found in the epithelium, dander, lingual glands, prostate and parotid glands.²¹ Sensitization to certain allergen molecules is associated with the risk of clinical allergy, as well as with the severity and persistence of allergic symptoms. Major dog allergens are Can f1 and Can f5.²² Sensitization to Can f1 is the most important prognostic marker of dog allergy and superior to measurement of IgE levels to dog allergen extract (ImmunoCAP).²² Can f5 is a prostate protein that is present in significant amounts in males and has homology with human PSA. This molecule may be as-

sociated with an increased risk of allergic reactions to human seminal fluid, possibly causing infertility.²³ Can f4 and Can f6 may also be associated with clinically significant symptoms.²⁴

Polysensitization (i.e., sensitization to >3 dog allergen molecules) is superior in predicting future dog symptoms than sensitization to dog extract. Furthermore, sensitization to both cat and dog allergen molecules is associated with more prevalent cat-and-dog-related symptoms and higher IgE levels of these molecules. Monosensitized and polysensitized subjects appear to belong to two different allergy phenotypes. Thus, molecular allergy diagnostics offer important advantages for the diagnosis of dog allergy in early childhood and help to predict the course of disease to adolescence.¹⁹

IF THE PATIENT IS ALLERGIC TO THE DOG BUT ALREADY HAS A DOG

Dog exposure should be minimized in dog-sensitized individuals to reduce the likelihood of developing asthma. Although the most advisable measure would be to avoid the animal, this is often impossible and associated with emotional impact.¹⁵ In these cases, it is recommended to apply a combination of several allergen avoidance measures continuously over time, such as washing the dog frequently (twice a week), excluding the dog from certain rooms, vacuuming frequently using vacuum cleaners with HEPA filters (air purifiers), removing pillows and all objects that can serve as reservoirs, using protective covers for mattresses and pillows, and cleaning with bleach.²⁵

If the patient is sensitized to a dog, it is possible to have symptoms without direct contact with the dog.¹⁵ Allergens can be transferred from houses with a dog to houses without a dog or in common spaces such as schools, workplaces, public spaces, etc., especially in populations with a high rate of pets. It is also known that in houses that have had animals, high concentrations of antigens persist for a long time, even in the absence of the animal.²⁶ In case of contact with schoolmates who own dogs, as they can carry dog allergens, it is also essential to shower and change clothes after contact with them.¹⁵ However, these recommendations do not guarantee clinical improvement nor avoidance of worsening of the allergic disease.

Considering that at least one allergen is present in every dog, patients should be advised that obtaining a so-called "nonallergenic/hypoallergenic dog" is not safer.¹⁵ The concentrations of dog allergens in homes with "hypoallergenic dogs" did not differ from other homes, and "hypoallergenic dogs" were no less allergenic than regular breeds.^{15,27} Currently, there is no hard evidence supporting hypoallergenic breeds, so they should not be recommended.

SPECIFIC IMMUNOTHERAPY

There is little evidence of specific immunotherapy with animal epithelia, in particular dogs. There are only three randomized, double-blind, placebo-controlled studies, all with modest results.¹⁵

HOW TO SELECT THE DOG

The average life expectancy of a dog is 7 to 10 years, so the ideal age for adopting a dog is at 8 weeks of age. Adopting juvenile or adult animals implies knowing their behavioral and health background. Some breeds are considered to be at higher risk of becoming aggressive, for example. Breeds recommended for children are the following: Golden Retriever, Poodle, Bichón Frisé, Beagle, Cairn Terrier and Collie. Female dogs are recommended for families getting a dog for the first time and those with small children due to their temper and behavior; they are also recommended for children allergic to Canf 5 only.⁶

WHAT IS THE ROLE OF THE DOCTOR?

The doctor should inform the family about all of the risks and benefits associated with owning a dog, contributing to an informed and conscious parenting decision. Factors such as daily available time, adequate space, alternative carers for periods of absence (vacations, work, etc.) and economic availability (food, veterinary care) must also be considered.⁶

CONCLUSION

A dog can be a catalyst for several dimensions of human social relationships and have an important role in children's social, emotional, and cognitive development. It also has a positive influence on mental health, well-being and quality of life. The benefits of pet ownership can supplant its risks, if certain conditions are met. The age of exposure to the dog can influence the risk of allergic disease. There is no evidence to support the existence of hypoallergenic species. As inappropriate behavior is the main cause for dog attack injuries it is essential that children are supervised when interacting with dogs. It is also advisable to carefully select the dog, taking into account its intrinsic characteristics, such as temper and the probability of getting aggressive.

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