TOWN OF STARKEY

TOWN OF STARKEY BREEDERS GUIDE TO TOWN REGULATIONS

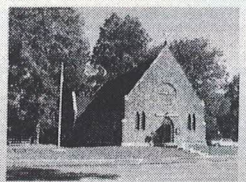
Breeding kennels within the township are a part time or sideline; family owned and operated business, that utilizes the participation of parents and their children. The breeding of dogs in commercial kennels has become the focus of intense debate specifically regarding the construction of the facilities and the care and welfare of the animals housed.

The goal of this guidebook is to increase the knowledge of all involved including current and future breeders as well as local officials involved in the permitting and oversight. Another goal is to significantly increase the percentage of dogs that successfully transition to new homes when retired. Improving the welfare of the dogs while they are living at the kennel, is also a primary goal.

Due to ongoing research into the best management practices for kennels by Purdue University and other organizations, we expect continuing and substantial, additional guidance in the coming years.

Therefore, this guide includes both current code regulations that any new kennel application must adhere to as well as topical reports of which all kennel owners should be aware and may discuss with your veterinarian. It is the intent of the township to add new, relevant, research information to the resource portion of this guide as it becomes available. As more definitive information becomes available, the Town may add to or amend required regulations. The Town will continue to seek input from all sectors of the community as those discussions occur.

The Town thanks the breeders and concerned citizens for their participation and knowledge in the discussions that led to the creation of this document.



40 Seneca St
Dundee, NY 14837

PHONE 607-243-5410
FAX 607-243-6674
EMAIL StarkeyTownClerk@yahoo.com

6.77 KENNELS

All kennels must be in compliance with USDA and /or NY State Ag and Markets regulations and require a special use permit from the planning board. In addition to the special use criteria in section 6.60 of this Local Law the planning board shall be guided by the following criteria.

1. Design elements to mitigate noise both inside and out to protect the animals' hearing as well as prohibiting nuisance noise impacting human neighbors.

2. Primary Pens, adjacent exercise areas and outside runs shall be a minimum of 200% of USDA standards and include daily access to an outside portion of the pen. Stacked pens will not be allowed for adult dogs. Whelping areas shall not be located adjacent to flooring that would allow feet to penetrate the flooring.

3. Waste shall be composted. Guidelines can be found in the town issued breeders guide. Piles shall be situated a minimum of 200 feet from any waterway, ditch, stream, pond or lake. Composted material shall not be used to grow crops for human consumption.

4. Flooring shall be solid or plastic-coated wire flooring with a minimum of 50% solid flooring required. Plastic covered wire flooring is permitted in the remaining area as long as the gauge of openings is small enough to prevent injuries to the size of dog being housed. Solid flooring may consist of tile, concrete and or other materials that provide an easily cleaned surface. Areas in which the dogs are housed, exercised, or allowed to roam in an enclosure shall be maintained daily as a clean and waste free environment.

5. Each breeding dog at retirement shall be spayed or neutered.

6. The application shall include a plan for exercise, socialization and grooming with the goal of successful re-homing for retired dogs.

7. Each applicant for a kennel shall provide the name of a fully certified veterinarian who has agreed to attend any animals to be housed at the proposed kennel, and submit a letter from that veterinarian containing the following:

    a) They are confident in the applicant's ability to properly care for the number of breeding dogs requested in the facility as designed.

    b) They will instruct the breeder in proper technique and equipment for any procedures that the breeder is allowed to perform by law. (list is available in the town issued breeders guide) **

8. In an ongoing effort to more openly assure our citizens of how kennels operate and produce well cared for animals, an agreed upon town representative, either a council member or planning board member may visit the kennel at least once a year to assess the effectiveness of these regulations.

**The Town was unable to obtain a definitive list of procedures at stated above; it is the Town's understanding that all procedure that require anesthesia must be preformed by a veterinarian.

USDA

United States Department of Agriculture

NRCS Natural Resources Conservation Service

Fairbanks Soil and Water Conservation District

Composting Dog Waste

December 2005

For More Information

USDA Natural Resources Conservation Service
800 West Evergreen Avenue, Suite 100
Palmer, AK 99645
(907) 761-7760
www.ak.nrcs.usda.gov

Fairbanks Soil and Water Conservation District
590 University Avenue, Suite B
Fairbanks, AK 99709-3641
(907) 479-1213

Credits

Photos by Ann Rippy, Cassandra Stalzer and Mitch Michaud, Natural Resources Conservation Service. Compost bin illustrations by Ellen Million and Noël Bell.

Thanks to the Alaska Department of Environmental Conservation and the U.S. Environmental Protection Agency for support and funding of the original study. And a huge thank you to all the mushers and kennel owners who were willing guinea pigs and creative innovators.

Introduction

Archeological evidence shows that dogs have been used in Alaska for hundreds of years as transportation, hunting, and pack animals. The tradition of living close to canines continues today as Alaska dogs function as devoted pets, competitive athletes, and tireless laborers.

The Environmental Protection Agency estimates that the typical dog excretes three quarters of a pound of waste per day—or 274 pounds per year[1].

A musher with a modest-sized kennel of 20 dogs must dispose of more than two tons of dog waste annually!

To get an idea of the scale of the dog waste generated in Alaska, consider that in Fairbanks and Anchorage alone, an estimated 20 million pounds of dog waste is produced each year.

Left alone, dog waste can pollute ground and surface water, attract flies and pests, cause an unpleasant odor, and create unsanitary living conditions for dogs.

Dog waste can also transmit parasites and infectious diseases.

Dog waste is a safe soil additive for revegetation and landscaping when it is composted properly.

Composting dog waste is a simple and inexpensive method for disposing of dog waste that can enhance the environment and reduce the amount of waste deposited in landfills[2].

The Dog Waste Compost Study

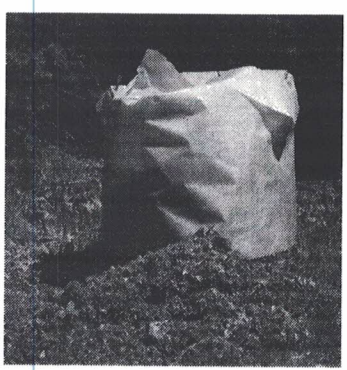
In 1991 the Fairbanks Soil and Water Conservation District, with technical assistance from the USDA Natural Resources Conservation Service, conducted a study with dog kennel operators to evaluate the possibility of composting dog waste in northern climates.

The goal of the study was to develop easy yet effective dog waste composting practices that reliably destroy pathogens found in some dog feces.

This publication draws upon the results of the original study and more than a decade of additional experience.

The Benefits of Composting

- Composting removes raw dog waste from the environment where it can pollute groundwater and streams.
- Good composting destroys pathogens and produces a safe soil amendment.
- Good on-site composting eliminates transporting dog waste to a disposal facility. This saves time, money, energy, and landfill space.
- Good composting produces a quality soil additive that improves both the physical condition and fertility of the soil.



Composting can reduce the volume of dog waste by 50 percent. The mature compost pile in the foreground once filled the bin seen in the background.

Uses for Dog Waste Compost

Compost is an excellent source of organic matter to add to your garden or potted plants. It helps improve soil structure which contributes to good aeration and moisture-holding capacity. Compost is also a source of plant nutrients.

Compost can also be used as a mulch material.

Dog waste compost can be used as a soil additive for revegetation, lawn establishment, and planting beds. It should not be used on crops grown for human consumption. When used in a potting mix or flower beds, a 25 percent compost blend is recommended. Compost has a relatively high salinity and is not recommended for germinating seedlings.

[1] The actual volume of dog waste depends on the dog and its diet. Working dogs that are fed high protein, high energy diets of concentrated feed will produce less waste than less active dogs that are fed a less concentrated feed.

[2] This study only included dog waste. Cat and other pet wastes were not studied. Cats may carry parasites that are harmful to human fetuses. We do not recommend adding cat waste or cat litter to your compost.

What is Composting?

Composting is the controlled breakdown or degradation of organic material into a product known as humus. Dog waste composting is a natural process that requires air, water, organic matter, microbes and a little human intervention.

Supplies

Composting requires a supply of nitrogen-rich materials (sometimes referred to as green or wet materials) and carbon-rich materials (dry or brown materials).

Nitrogen rich (wet) materials include:

- dog waste
- green grass clippings
- vegetable waste
- other animal manures
- bagged fertilizer

Think Protein!

Nitrogen is a major component of protein, so when you look for nitrogen rich materials for your compost, look for materials high in protein like fish waste, blood meal, cottonseed meal, and some kitchen scraps.

Carbon rich (dry) materials include:

- sawdust
- chopped straw or hay
- shredded newspaper
- dog bedding
- fallen leaves

- A long-stemmed thermometer is necessary to monitor compost temperature and can be found at some garden supply stores.

- You might find a moisture meter helpful for monitoring the moisture content of the compost pile.

- You will also need a shovel or fork for turning the compost. Our experience was that a long-handled hay fork is easiest to use when turning and mixing, while a shovel is handy for adding and measuring ingredients.

- You will need some kind of bin to contain the composting material. You can compost in a pile or a pit, but it will be difficult to reach the high temperatures needed to destroy pathogens and the process will take longer. Bins improve aeration and facilitate easy turning of the compost. See bin designs on page 4. You will need at least two bins, one for collecting waste while the other is actively composting.

- You will also need a reliable supply of water. Although water from a garden hose is fine, you may want to temper your water by letting it sit in the sun to warm before adding it to the compost. Cold water, even from rain, will lower the temperature of the compost. This is one reason to keep a cover on your compost bin.

REMEMBER—Small particles have greater surface area than large particles. The finer your composting ingredients are chopped, the hotter your compost will be and the faster it will progress. The best carbon source identified in our study was fine sawdust like that found at a woodworking shop or construction site.

Dog bedding is a ready source of carbon rich material in some kennels.

Composting Dog Waste—Step by Step

There are two methods you can use to build your compost pile. The first is to collect the materials separately and then mix them all at once. The advantage of this method is that the materials will not begin to decompose until mixed. You will get the highest temperatures and the fastest compost when dog manure, carbon, water, and air are all introduced at the same time. However, this method might have a higher "gag factor."

Compost Recipe

Proportions:
2 shovels full of dog waste
1 shovel full of sawdust or other carbon rich material
Build the pile:
Thoroughly mix sawdust and dog waste, adding water as you go.
Keep covered and let it "cook."
When the temperature drops, turn the pile.
Repeat until the temperature stops rising after turning.
Cooking time varies from 6 to 8 weeks.

The second method is to add the carbon source to the dog waste as you collect it from the dog yard and mix it as it is placed in the bin. This method is easier and as long as the pile remains dry, very little decomposition should happen until you are ready to turn the pile and add water. Because the pile of mixed dog waste and carbon will have a less offensive odor than if the materials are collected separately, many people prefer this method.

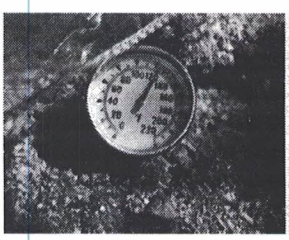
- To begin, choose a sunny, dry site near the dog area for your compost bin. The site should not be near pregnant or nursing dogs, or where runoff from the pile would flow into the dog yard.
- For every two shovels full of dog waste, add one shovel full of sawdust or other carbon source. Mix thoroughly after each addition.
- Add water in small amounts until the compost mixture is as moist as a wrung out sponge.
- Continue adding ingredients until the compost is two to three feet deep. Once a bin is full, do not continue adding fresh materials.
- Place a cover on the compost mixture. Microbes will begin breaking down the organic materials. As the microbes go to work, they release heat and increase the temperature of the compost pile.
- Insert the compost thermometer daily and record the internal temperature. When the temperature starts to decline—usually in two weeks—it is time to turn the compost.
- Turn the entire compost pile—from the outside to the inside—in order to ensure that all the material reaches the high temperatures needed to kill pathogens. Repeat the turning process each time the internal temperature of the compost drops. After several cycles, the compost will not heat up. This indicates that the compost process is complete.
- Cure your finished compost for several months or even a year before using it. This will stabilize the pH and ensure that the decomposition process is complete.

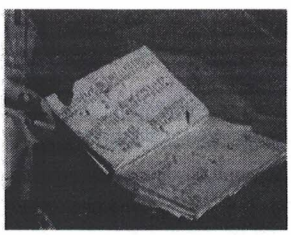
REMEMBER—It takes at least 10 dogs, preferably 20, to generate enough waste to maintain a bin. A large pile (3 to 5 foot cube) is needed to provide insulation and keep temperatures high in the pile's center. For fewer dogs you can keep a separate compost bin for dog waste and add grass clippings or other nitrogen sources to increase the volume. Treat the finished compost as you would other composted dog manure.

Compost and Temperature

The temperature of a compost mixture is very important. It reflects the level of microbial activity. The center of the compost mixture is the hottest, so insert the thermometer toward the center when taking the temperature. Repeat this in several places. Write the temperature with any comments in a daily record.

A thermometer and good record keeping are essential to successfully composting dog waste.





Temperatures in fresh compost mixtures rise quickly—up to 160° F and greater—then decline slowly until the compost temperature approaches air temperature. If you do not see this rapid rise and gradual decline of internal temperatures, the compost recipe may need to be adjusted (see Troubleshooting tips on page 8).

Declining temperatures indicate it is time to turn the compost. Take care to mix the outside materials towards the center. It will take several turnings over a period of six weeks or more for the compost to be mature.

Compost temperatures can get too high. Don't plunge your hand into the center of an active compost pile. In very rare cases, extremely high temperatures can cause a pile to ignite. Add water to a very hot pile to quickly drop the temperature.

Important!

Compost must reach 145°F for several days to destroy pathogens.

Composting and Winter

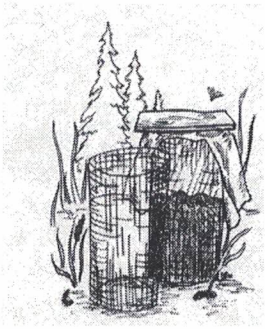
It is possible to compost into the fall, but eventually the cold inhibits the microbial activity. The result is a build up of dog waste in the winter months. With a little planning, the buildup can be added to bins during the winter, and then effectively composted in the warmer months. During the Fairbanks Soil and Water Conservation District study, these steps encouraged good composting throughout the year:

- When clearing waste from the dog area, add the carbon source directly to your bucket, wheelbarrow or whatever receptacle you use for collection. Mix the carbon source and dog waste together, then add the mix to the compost bin.
- Store the compost ingredients directly in the bins; after spring thaw, turn the pile and add water to begin composting.
- Avoid mixing excess snow with the dog waste.
- Don't let your pile grow too large. If your winter compost pile will exceed five feet across before spring, either start a second pile or consult local NRCS staff for more information on large-scale animal waste composting systems.

Compost Bin Designs

There are many bin designs to choose from and new ideas come along every year. Spend a little time learning about bins now, and you might save yourself frustration and expense later on. Choose a system that meets your individual needs and fits your site.

Wire Cylinder



Wire bins were overwhelmingly preferred by mushers participating in the Fairbanks study. They are inexpensive and can often be built from materials on hand (see instructions on page 7 to easily construct this bin). Some have a wooden frame to provide support, and many can be made larger or smaller to accommodate the amount of material available for composting.

The compost material in wire bins is very easy to turn. The bin can be disassembled then reassembled next to the compost pile. The compost is then turned back into the same bin.

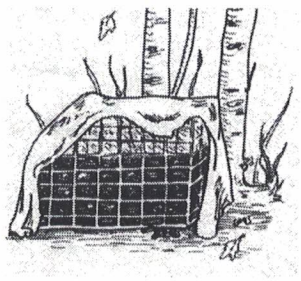
Wire bins allow the most air to reach the material, resulting in high compost temperatures and more complete destruction of pathogens. Wire bins produce hot, fast compost that will mature quickly, but the bins need to be tended more intensively than do other designs.

Wire bins are a good choice where rodents or other pests are a problem.

One drawback to wire bins is that they do not retain heat as well as plastic or wood bins and so probably are not a good choice for cool, wet climates or areas with an extremely short compost season.

Some wire bins are not very sturdy and can be crushed in a busy dog yard. Don't expect light weight wire bins to last more than a few years.

Wire Bin (Puppy Pen)

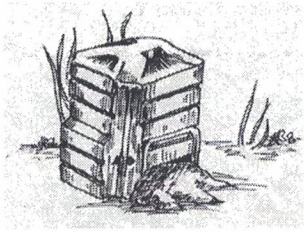


Puppy pens are a good choice for composters with only a few dogs and who plan to add a lot of leaves and grass clippings to their compost. You can find commercial versions of these wire bins, which makes them convenient for those who don't want to build their own.

Be aware that wire bins with large openings may have trouble containing compost. But like other wire bins this design provides the most air to the compost material, which produces hot, fast compost.

Wire bins do not retain heat as well as plastic or wood bins. They are probably not a good choice for cool, wet climates or areas with a frost-free season of two months or less.

Rigid Plastic Bins

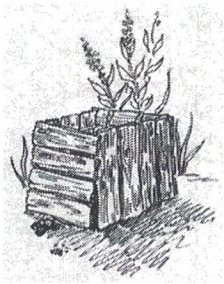


These bins are small and blend in with gardens and landscaping. They tend to stay warmer in cool, wet weather than some of the other designs, which can extend the composting season into the fall months.

If time to tend the pile is limited, then rigid plastic bins are a good choice. You can add material at the top and use an aerator tool for mixing. Finished compost is extracted from an opening in the bottom.

These bins allow less air to reach the material than do wire bins and therefore do not reach the high temperatures you can expect with wire bins. They also are too small to compost waste for large numbers of dogs.

Pallet Bin



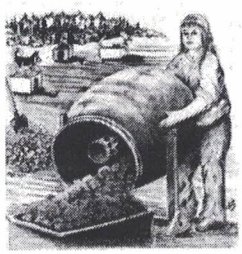
Wooden bins that are made from pallets or slab wood are cheap and effective. You can build a bin with four pallets and a few feet of twine in less than an hour.

Pallet bins are not very flexible in terms of size, are very heavy and can make turning the compost difficult. Wood tends to decompose over time and bins will have to be replaced after a few years—particularly in wet climates.

Pallet bins are an excellent choice for storing carbon materials and finished compost.

Pallet bins allow the compost material to receive plenty of air but they are not a great choice if rodents or other pests are a problem. Lining a pallet bin with hardware cloth is an option if pests are a problem.

Tumbler Bins



Tumbler-type compost bins tend to be more expensive to build or purchase. Some incorporate a pipe for passive aeration but all are intended to be rotated to stir the compost.

For many tumbler models, rotating the bin is more difficult than it looks. Physics is on your side but you are still moving the entire contents of the bin at one time. Some bins have the annoying habit of losing the lid and dumping the contents on your feet. If possible, try using the tumbler before you purchase it.

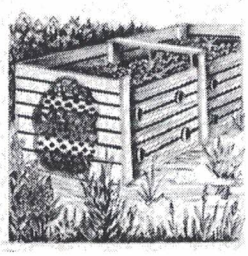
These bins should not be filled more than about one-half full to leave room for mixing. Tumblers allow less air to reach the compost material than do many other systems and do not reach the high temperatures you can expect with wire bins.

Stacking Type

You can purchase a three-tier stacking bin made of recycled plastic or build your own out of wood. Either way, this kind of bin is easy to turn and very tidy looking.

These bins share many of the drawbacks of the rigid plastic bins. They are small and do not allow a lot of air to reach the compost material, but they retain heat well and may extend the compost season.

Passive Aeration



Passive aeration can be used with a variety of bin types. The idea is to get oxygen into the center of the pile without having to turn or stir the compost. Perforated pipe is inserted into the compost as the pile is constructed. The ends of the pipe are left open to allow air exchange.

The initial construction of a passive aeration system requires a little more forethought and a lot more management than a turned pile, but it eliminates much of the work. The compost temperature should

be monitored and water must still be added regularly.

One step up from the passively aerated pile is a forced air system where a blower or pump is connected to pipes to force air into the center of the pile.

For help designing forced aeration and other complex systems consult NRCS or another qualified professional.

Compost Maturity

The easiest way to determine if compost is mature—meaning all the organic materials have degraded—is by monitoring the temperature. If, after several turnings, rewettings and aerations, the compost does not reheat spontaneously, it is probably mature.

Compost maturity has important implications for plant growth. The final step in composting is to cure the compost for at least a month and preferably over winter.

Cured compost does not compete with plants for nutrients. If unfinished compost is mixed into the soil, it may tie up oxygen and nutrients necessary for plant growth. These nutrients are not gone from the soil, but made unavailable to the plants until the organic matter is broken down.

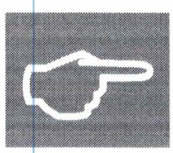
Mature compost has a dark color, is moist and crumbly, and has a pleasant earthy odor.

Health Concerns

All compost contains mold and fungus spores which may cause an allergic response in sensitive individuals.

Keep animals, particularly puppies and pregnant females, away from the compost area to prevent transmitting any disease to other dogs, livestock, and wildlife.

Dogs can transmit diseases to humans regardless of whether you are petting a dog or shoveling waste into a compost bin. Children can be at greater risk because they frequently put their hands and other items in their mouths.



REMEMBER—The best way to decrease health risks associated with dog waste is to have healthy dogs. Follow a worming schedule developed by a veterinarian familiar with local conditions.

Health risks vary depending on the climate, so ask a local veterinarian to recommend a parasite control program suitable for your area.

Although there are many potential pathogens, the primary agents for disease are roundworm eggs. They are too small to see with the human eye. Dogs become infected with roundworms by swallowing the eggs in soil where other dogs have defecated. Infected female dogs pass on roundworms to their puppies. Roundworm eggs hatch in the dog's intestine, migrate through the liver and lungs and return to mature in the intestine. The adult roundworm lays eggs which are passed on to the soil, thus completing the life cycle. If humans ingest the eggs, they hatch in the intestine and migrate to other body tissue like lungs, liver, and spinal cord. The larvae can even attack the retinas in the eye.

In certain geographical areas, other parasites may be a problem. One tapeworm (*Enchinococcus sp.*) found in remote regions can produce life-threatening cysts if ingested.

Disease transmission from most parasites one might encounter when composting dog waste can be avoided by not coming in contact with the eggs.

Do not compost waste from dogs showing signs of disease or illness. This waste should be disposed of in another manner.

Decrease health risks by:

- Wearing rubber gloves and always washing hands after handling dogs or dog waste
- Confining dog waste to a specific area
- Not including waste from unknown dogs
- Keeping dog waste tools and clothing separate from other tools and clothing
- Not feeding dogs raw meat or fish
- Do not allow children to play in areas where dog waste compost has recently been applied
- Consulting a veterinarian about a parasite control program for your area
- Not applying dog waste compost to crops intended for human consumption

Building A Wire Compost Bin

Materials:

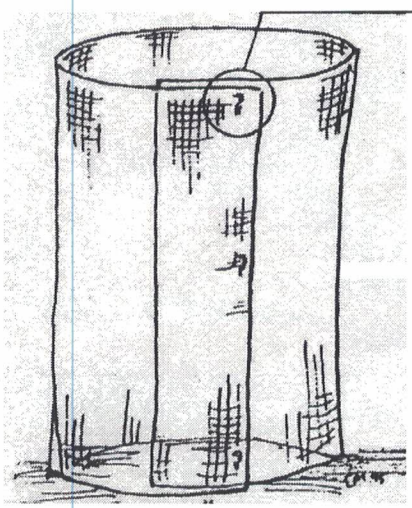
- ✓ 10' of ½" hardware cloth, 3' wide
- ✓ 3 swivel snaps
- ✓ Wood or plastic for bin cover

Tools:

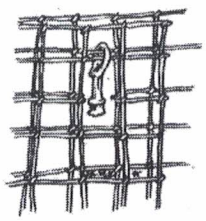
- ✓ Wire cutters
- ✓ Gloves
- ✓ Tape measure

Cut a 10' length of hardware cloth. The cloth will naturally form a circle because it has been stored in a roll. Overlap the edges of the cloth by at least 6". Use the wire cutters to remove one side of a ½" square. This makes it easier to clip the swivel snaps into the hardware cloth. The cut will need to go through both layers of hardware cloth. Make three of these cuts evenly distributed along the overlap as shown in the drawing. Clip the bin together using the three swivel snaps. Stand the bin upright and fill the bin with materials to be composted. Cover the bin with a sheet of plastic or piece of plywood to retain heat and keep out rain.

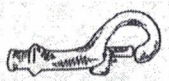
Finished Bin



Clipping the Bin Together



Brass Swivel Snap



Troubleshooting

Condition	Possible Cause	Solution
Compost does not heat up or heats up slowly	➢ Not enough nitrogen source	Add dog waste or other nitrogen source
	➢ Not enough moisture	Add water
	➢ Not enough air	Turn compost pile
	➢ Too much moisture	Add dry materials, mix and cover
Compost smells bad	➢ Too much nitrogen source	Add sawdust or other carbon source
	➢ Too much moisture	Add dry materials, mix and cover
	➢ Not enough air	Turn the compost pile and/or consider an alternative bin design
Fly infestation	➢ Fresh materials near the surface	Cover new compost with a layer of finished compost, sawdust or wrap bin in porous weed control fabric
Extremely high temperatures in excess of 160°F	➢ Compost pile too large or too much air	Divide compost, add water and turn You can add water in an emergency to quickly lower temperatures

Record Keeping Sheet

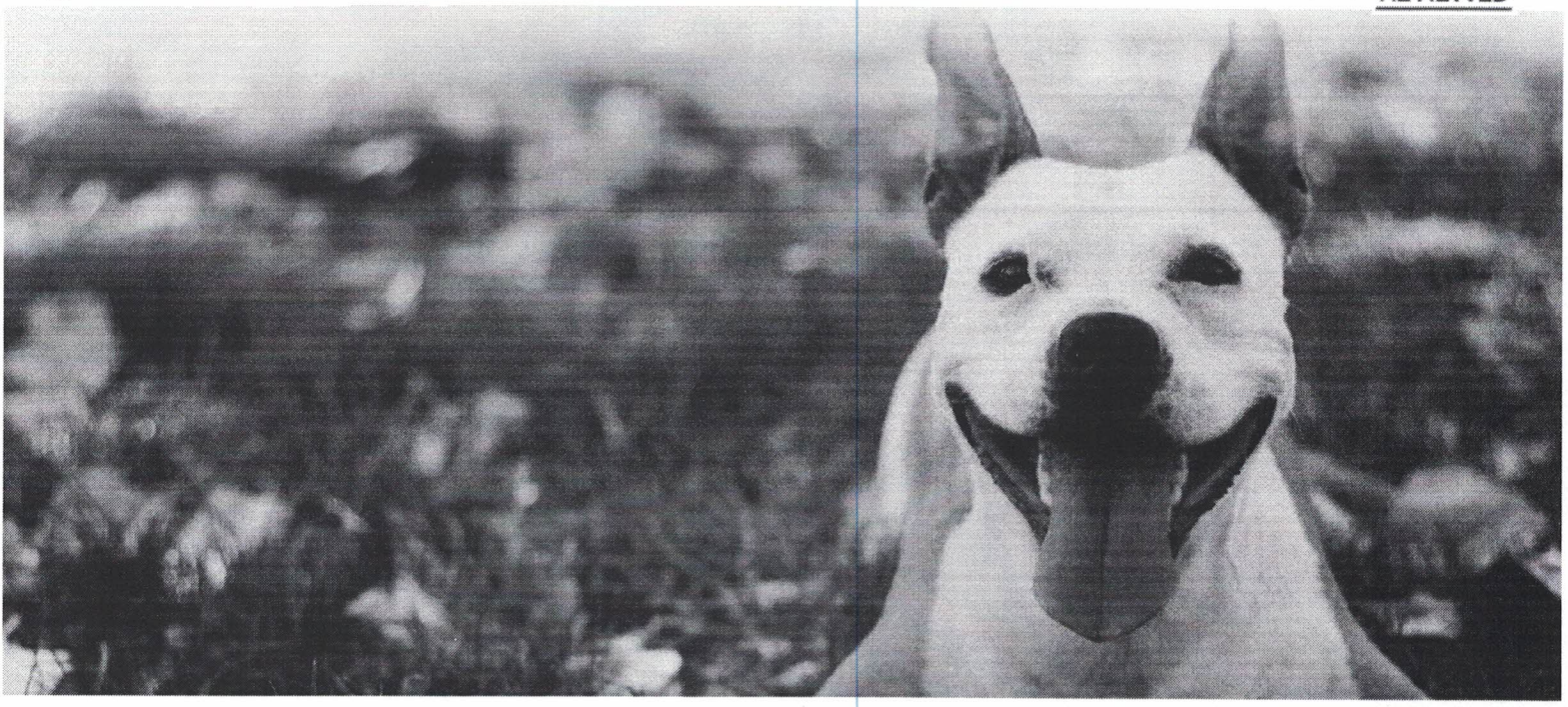
Kennel Name _____ **Starting Date** _____

Date	Temperature	Comments
Example 6/12	98	Loaded bin today -temp already rising

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

VA-19-W

EXPERT REVIEWED



Animal Welfare Concepts: Applications to Dogs

Judith Stella and Candace Croney,
Department of Comparative Pathobiology, College of Veterinary Medicine, Purdue University

Introduction

Animal welfare can present a complex, contentious challenge for many types of animal care and use scenarios. While the care and welfare of animals used for production of food often receives significant media coverage in the U.S. and abroad, similar concerns about treatment extend to animals maintained for other purposes, such as research, teaching, sport/entertainment and companionship. Although the ultimate purpose for which dogs are intended may differ, their basic welfare needs will generally tend to be similar and must be well understood in order to be met.

What is animal welfare?

Different definitions exist for the term "animal welfare." One of the most well established definitions states that animal welfare is the state of the animal in regard to its attempts to cope with its environment (Broom, 1986). More recently the World Organization for Animal Health has defined animal welfare as "how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behavior, and it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and appropriate veterinary treatment, shelter, management and nutrition, humane handling and humane slaughter or killing." (OIE, 2012).

Some use "animal welfare" and "rights" interchangeably, but the terms are not the same. "Animal rights" refers to a philosophical view of the moral status of animals that indicates whether, and under which conditions, animal use is acceptable, and which moral criteria are relevant in making such decisions. In contrast, "welfare" refers to the state of the animal or the quality of life the animal experiences.

Basis for animal welfare considerations: the Five Freedoms for Animals

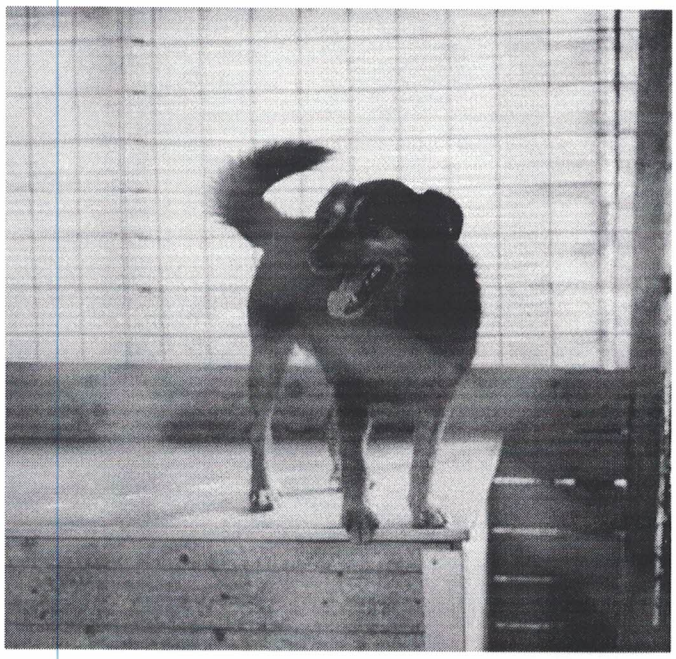
Almost all modern policies and considerations pertaining to animal welfare have been informed to some extent or incorporate some aspects of what are now widely known as the Five Freedoms for Animals. In response to social concerns about agricultural animal treatment that was widespread in the UK around the 1960s, the UK government appointed a technical committee to "Examine conditions of livestock kept in intensive husbandry systems, advise about whether standards should be set in the interests of their welfare, and what the standards should be." The 1965 report of the Brambell Committee (Brambell, 1965) subsequently set forth the following ideal states for animals that provide a basis against which to consider animal welfare:

1. Freedom from hunger, thirst and malnutrition. By access to fresh food and water, diet balanced to maintain full health.
2. Freedom from pain, injury and disease. By prevention and/or rapid diagnosis and treatment.
3. Freedom from discomfort. By providing an appropriate environment.
4. Freedom from fear and distress. By ensuring conditions and treatment which avoid psychological suffering.
5. Freedom to express normal behavior. By providing sufficient space, proper facilities, social interaction.

How is animal welfare assessed?

Assessment of the overall welfare of groups of animals is often done in an effort to gauge the quality and appropriateness of a facility's care and management practices, but it is vital to note the importance of assessing welfare at the individual animal level. Further, how well an animal is doing (in other words, the animal's state of being) may vary across a continuum that can range from very good to very poor. This status may differ between individual animals and can change within an animal as a function of various factors, such as the animal's stage of life or reproductive status, age, season, or nutritional status.

There are three general conceptions of animal welfare (Fraser et al., 1997) — that animals should feel well, function well and be able to lead reasonably natural lives. The feelings conception of animal welfare captures the idea that animals should experience positive emotional states (pleasure, contentment) and minimally experience negative ones (fear, boredom or frustration). The functioning conception reflects the idea that animals should be healthy, and able to grow and maintain normal physical,



physiological and behavioral function. The natural living conception indicates that animals should be able to lead "reasonably natural lives" through development and use of species-typical adaptations and capabilities. In addition, whenever feasible, natural elements should be incorporated into animals' living spaces.

While none of the three conceptions by themselves can fully characterize animal welfare, an integrated approach that incorporates all three may allow us the most accurate sense of how well an animal is doing or coping in a given environment.

Applications to dogs

Applying these basic concepts of animal welfare can help to ensure that caretakers continually improve a dog's quality of life.

Dogs that feel well should indicate positive emotional states. For example, do the animals more often than not indicate by their behavior that they are relaxed, calm or playful, or is there evidence of ongoing fear, boredom (unresponsiveness), frustration or pain?

To determine if a dog is functioning well may require focusing on aspects such as the dog's overall health. Signs of illness — vomiting, diarrhea, coughing, sneezing, ocular and nasal discharge, injury, lameness, etc. — are useful indicators of physical well-being status, as are body condition, coat quality, growth, and litter size and quality (if, for example, she is a breeding female).

Are the dog's behavioral systems functioning appropriately? Evidence might be found by examining whether the dog is able to show normal patterns of behavior and adaptation to its environment. Evaluating the extent to which the dog is permitted opportunities for reasonable aspects of natural living might involve considering whether she is able to socialize with other dogs as well as people, and whether he has access to fresh air, the outdoors and the ability to socialize with other animals (dogs and people) in normal ways.

In short, when assessing animal welfare, it is critical to pay attention to both the physical and behavioral indicators of the animal's status. Neither category alone is sufficient to accurately gauge dog welfare. It is not enough to focus solely on whether a dog is physically healthy. Mental and behavioral health are also critical for dogs to function well as good, safe companions and as partners in the human-animal bond. In addition to health, caretakers must consider factors such as whether dogs can exercise (run, swim), dig, bark, and chew. The extent to which dogs show evidence of stereotypic behaviors that may indicate trouble coping with their environments, such as pacing, circling, or wall-bouncing, must also be evaluated. Incorporating multiple aspects of welfare in this manner may help to ensure that dogs' needs are comprehensively addressed, regardless of their environments.

References

Brambell, F.W.R., 1965. Report of the technical committee to enquire into the welfare of animals kept under intensive livestock husbandry systems. (Command Rep. 2836). London: Her Majesty's Stationery Office.

Broom, D.M., 1986a. Indicators of poor welfare. Br. Vet. J. 142: 524.

Broom, D.M., 1988. The scientific assessment of animal welfare. *Appl. Anim. Behav. Sci.* 20, 5-19.

Fraser, D., Weary, D.M., Pajor, E.A., & Milligan, B.N., 1997. A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare*, 6, 187-205.

OIE, World Organization for Animal Health. http://www.oie.int/en/animal-welfare/animal-welfare-key-themes/ Accessed June 2015.

Dec. 2016

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

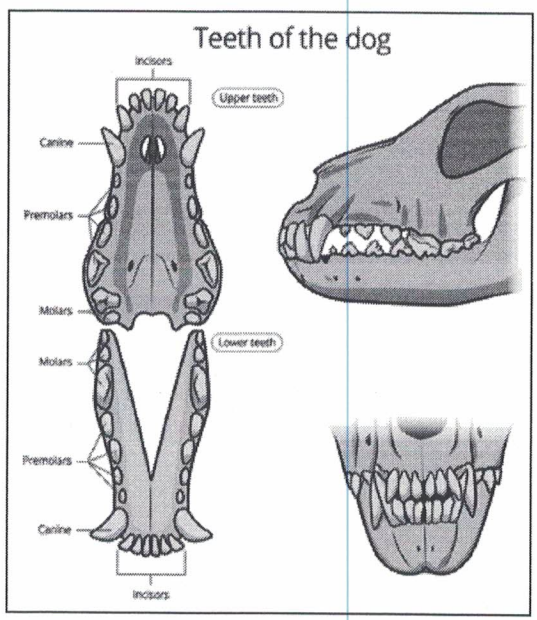
VA-12-W

EXPERT REVIEWED

Welfare Implications of Dental Health in Commercial Breeding Dogs

Judith Stella, Ph.D., and Candace Croney, Ph.D., Purdue College of Veterinary Medicine

Introduction



Periodontal disease is a significant health problem that can result in pain, gingivitis (redness and swelling of the gums), tooth loss, systemic disease (e.g. cardiovascular and kidney disease) and, in humans, adverse pregnancy outcomes (Harvey, C. 1998; Glickman et al, 2009; Gorzó et al, 2004). In adult dogs, periodontal disease is commonly observed. In fact, it is estimated that at least 75% of dogs have some degree of dental disease (Harvey, 1998; Niemiec, 2008), as a result of infection and inflammation of the gums, bone and tissue surrounding and supporting the teeth, initiated by an overgrowth of bacteria in the gums. Other than bad breath, there are few signs associated with early disease. With severe disease, dogs may exhibit excessive drooling, difficulty in eating and weight loss.

Periodontal disease is commonly separated into two conditions: gingivitis, an inflammation of the gingiva, or gums; and periodontitis, an inflammation of the tissues that surround and support the teeth, which is classified into stages of severity. The occurrence of periodontal disease has been reported to significantly increase with age and decrease with increasing body weight, suggesting that smaller breed dogs may be at greater risk than larger breed dogs. Additionally, gingivitis has been associated with nutritional deficiencies of vitamins A, C, D and E, and the B vitamins folic acid, niacin, pantothenic acid and riboflavin (Logan, 2006).

The disease is often described as more prevalent, more severe and less likely to be treated by a veterinarian in dogs used for commercial breeding than for pet dogs or hobby breeding dogs. Given the potential adverse health outcomes for dogs with periodontal disease, it is important for dog breeders, owners and caretakers to attend to preventive dental care and seek therapeutic interventions early. Knowing about current preventive care practices and therapeutic interventions that decrease the occurrence and severity of dental disease may help owners determine which interventions are most effective and practical for them.

Preventive Care

Although common in the pet dog population, periodontal disease is considered one of the most undertreated health conditions. The gold standard of home care is daily brushing of the dog's teeth, but this is not always practical, and owners often do not continue daily brushing (Miller and Harvey, 1996). The second best option for at-home dental care is to feed approved dental diets (e.g. Hill's t/d diet[a]) and treats (e.g. CET enzymatic chews[b]) (American Veterinary Dental College, 2015). Though it is commonly believed that a dry kibble diet, rather than a wet or canned diet, decreases risk of periodontal disease, this has not been proven. Additionally, it is recommended that all dogs be evaluated at least yearly by a veterinarian to assess the need for a thorough dental cleaning under anesthesia.

Due to the costs associated with dental cleaning by a veterinarian, as well as the perceived and real risks of anesthesia, many owners have sought alternative methods of maintaining dental health. These include anes-

thesia-free dentistry, termed non-professional dental scaling by the American Veterinary Dental College (AVDC) (AVDC, 2015). However, significant welfare concerns are associated with non-professional scaling, including risk of injury, pain and discomfort to the dogs, as well as improper and incomplete cleaning, and damage to the teeth. It is unknown how common this practice is in both the dog breeding community as well as among pet owners.

Health Risks Associated with Periodontal Disease

Another concern of periodontal disease is its association with an increased risk of developing other diseases resulting from bacteremia (bacteria in the blood). Diseases that have been shown to be associated with periodontal disease include chronic bronchitis and heart, kidney, and liver disease (Glickman et al, 2009). The most commonly cited secondary organ system affected by periodontal disease is the cardiovascular system in both humans and dogs. For example, in a study of 59,296 dogs, an association was found between the severity of periodontal disease and the risk of cardiovascular-related disease conditions. The authors concluded that greater awareness and importance of canine dental health and routine preventive care would improve overall health (Glickman et al, 2009). Additionally, the American Veterinary Dental Society cautions dog owners "that oral bacteria will be filtered out by the kidney and liver, and can cause micro-abscesses within these organs. This leads to a decrease in function of these vital organs over time." (Glickman et al, 2009).

Dental Health in Commercial Breeding Dogs

Commercial dog breeding facilities are often portrayed as maintaining dogs in substandard conditions relative to housing, sanitation and veterinary care. One area emphasized as being of notable concern is periodontal disease. The Humane Society Veterinary Medical Association has noted that "severe periodontal disease is routinely seen in breeding stock. … The dogs often have a painful, infected mouth with loose and missing teeth." These concerns, if valid, would represent significant animal welfare problems. However, to date no scientific evaluation of the prevalence or severity of periodontal disease in commercial breeding dogs, or of management practices employed to address it, has been conducted.

Of particular concern to dog breeders and animal health professionals is the health of the puppies produced. Recent studies suggest that periodontal disease may induce inflammatory responses throughout the body that increase the risk of adverse pregnancy outcomes. Studies in humans have suggested an association between periodontal disease and adverse pregnancy outcomes, including low birth weight, premature babies, miscarriage and pre-eclampsia. Another study indicated that early dental disease during pregnancy can be regarded as an important risk factor for premature birth (Hope et al, 2014). Anecdotally, dog breeders who have incorporated routine dental care into the management of their breeding stock have reported increased litter size, decreased mortality rates, and healthier puppies (personal communication with USDA, 2015). No scientific evaluations of the association between periodontal disease and pregnancy outcomes have yet been reported in dogs.

Conclusions

Periodontal disease affects large numbers of dogs, often resulting in pain and secondary diseases. While the prevalence and severity of dental disease in pet dogs has been well documented, such information about commercial breeding dogs is not currently available. More research of this population is needed to identify risk factors, associated systemic diseases, effect on pregnancy outcomes, and practical preventive care strategies that can be implemented to minimize dental disease and lead to further improvements in the health and welfare of all dogs.

For more information:

American Veterinary Dental College,
http://www.avdc.org/home.html

American Veterinary Dental Society,
http://www.avds-online.org/newweb/index.php

Veterinary Oral Health Council,
http://www.vohc.org/protocol.htm

References

American Veterinary Dental College (AVDC) Position Statements. Available at http://www.avdc.org/statements.html. Accessed Nov 12, 2015.

Glickman LT, Glickman NW, Moore GE, Goldstein GS and Lewis HB. 2009. Evaluation of the risk of endocarditis and other cardiovascular events on the basis of the severity of periodontal disease in dogs. *J Am. Vet. Med. Assoc; 234*:486-494.

Gorzó RM, Nagy I, Urbán E, Novák E, Pál T. 2004. A possible association between preterm birth and early periodontitis. Pilot study. *J Clin Periodontol 31*: 736– 741.

Harvey, C. 1998. Periodontal Disease in Dogs; Etiopathogenesis, Prevalence, and Significance. *Vet. Clinics of N Am: Sm Anim Prac. 28*:1111-1128.

Hope CK, Wang Q, Burnside G, Adeyemi AA, Quenby S, Smith PW, Higham SM, and Whitworth M. 2014. Assessing the Association between Oral Hygiene and Preterm Birth by Quantitative Light-Induced Fluorescence. *The Scientific World Journal*; Article ID 374694, 9 pages.

Logan E. 2006. Dietary influences on periodontal health in dogs and cats. *Vet Clin North Am Small Anim Pract. 36(6)*:1385-1401.

Lund EM, et al. 1999. Health status and population characteristics of dogs and cats examined at private veterinary practices in the United States. *J Am. Vet. Med. Assoc.; 214(9)*:1336-1341.

Miller BR and Harvey CE. 1994. Compliance with oral hygiene recommendations following periodontal treatment in client-owned dogs. *J Vet Dent. 11*:18-19.

Niemiec B. 2008. Periodontal Disease. *Topics Comp Anim Med 23*:72-80.

Feb. 2016

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

VA-11-W

EXPERT REVIEWED

Implications of weaning age for dog welfare

Moriah Hurt B.S., Judi Stella Ph.D. and Candace Croney Ph.D.

Introduction

Weaning is an important stage in dog development, and maximizing the welfare of dams and their offspring can promote adult dog well-being. During the weaning process, puppies begin consuming semi-solid food at around three weeks of age, and they typically are separated from their dams between six and eight weeks of age for re-homing. This coincides with a stage in puppy development that involves critical learning and has long-term implications for behavioral wellness as adults. To optimize the well-being of puppies as well as adult dogs, it is essential to consider the weaning ages and practices used as well as their relationship to developmental processes.

The weaning process

Weaning is the gradual process of young mammals transitioning from a liquid-based milk diet to solid food. For puppies, the weaning process begins at about three weeks of age when they begin to leave the nest box and eliminate without stimulation from the dam (Lindsay, 2000). Variation in the amount of solid food and milk intake between different litters, and sometimes between puppies of the same litter, is normal (Malm and Jensen, 1996). It is also important to note that some aspects of the weaning process, such as when the dam stops producing milk, may differ by breed or breed type. Dams cease milk production between seven to 10 weeks after giving birth (Scott and Fuller, 1974). Different growth rates, metabolic and nutrient needs between breed/breed types must be considered. Toy breeds, even after eight weeks of age, can be susceptible to hypoglycemia. Large-breed puppies undergo a rapid growth rate and are susceptible to nutrient and caloric imbalances, causing conditions such as developmental orthopedic diseases (see Lauten, 2006 for more detail). Managing the weaning process for different breeds should therefore be done carefully to ensure that all dogs receive the proper care.

During weaning, the dam may begin regurgitating food for her puppies and will make nursing more difficult by not lying on her side, moving away or pushing puppies away when they try to nurse. Other factors affecting when and how weaning occurs include whether the dam has access to an area away from her pups, how much time she spends away from them, if she regurgitates food for them, and if there is communal rearing (Malm and Jensen, 1996), which can occur when dogs are housed in compatible groups. In general, puppies are fully weaned to solid food between seven and 10 weeks of age (Scott and Fuller, 1974).

Weaning does not consist merely of transitioning puppies to solid food, however. An important component of the process involves the development of puppies' independence from their dams. It begins with brief, gradually increasing periods of separation initiated by the dams leaving their nests or whelping areas for respite from their puppies. Because weaning and separation from the mother is a complex process that can have lifelong effects, abrupt weaning or interruptions in gradual weaning can be detrimental. For example, abrupt

weaning at a specified age (e.g., six weeks) for all puppies may adversely affect those that are not as physically or psychologically ready to cease nursing entirely.

Implications of weaning and separation age

Because weaning and separation of puppies from their dams coincide with one of the earliest and most important sensitive periods for learning, it is important that puppies are not weaned too early or abruptly. Puppies are typically separated from their dams and littermates for placement in a home between six and eight weeks of age. This may intuitively make sense because at that age, puppies are motivated to make social contact with strangers and form lasting social bonds with family members (Serpell, 1995; Fox and Stelzner, 1966). However, during this period of development, puppies are also particularly sensitive to psychological and physical disturbances, and separation from their dams, littermates, and familiar environments may result in fear, distress and impaired learning. For instance, Elliot and Scott (1961) observed more stress vocalizations (whines and yelps) in puppies separated and placed in an unfamiliar room away from their dams and littermates at six weeks of age than when tested independently at later ages even when they had some previous experience with the test room.

In addition, it is speculated that between three and 16 weeks of age, puppies may learn more about how to interact with their environments than during any other period in their lives (Lindsay, 2000). Puppies depend not just on their dams but their littermates to learn important behaviors that have lifelong implications. For example, between three to five weeks of age, puppies learn preferences for surfaces on which to eliminate and normal elimination behaviors, such as eliminating away from resting areas. They also begin to engage in social play with littermates, learning behaviors related to social hierarchies and bite inhibition. Later, such behaviors are difficult for people to teach to puppies that didn't learn during the sensitive period. Puppies separated from their dams and littermates too early often tend to bite more readily and harder than those that are separated at eight weeks of age (Lindsay, 2000; Fox and Stelzner, 1967), and they may also develop other behavioral problems as adults, such as high reactivity, anxiety, attachment-related problems, and inter-dog aggression (Lindsay, 2000; Pfaffenberger, 1963).

Benefits to separating and weaning at older ages

Separating puppies from their dam and littermates later — at least 8 weeks of age — can allow them more time to learn from the dam and littermates and facilitate learning through observation and interaction. Important skills taught by dams at this age include responses to familiar and unfamiliar humans in different situations. Slabbert and Rasa (1997) found that puppies of nine to 12 weeks of age that were allowed to observe their dams performing narcotics searches were better narcotics detectors at six months of age than those without the benefit of such observational learning opportunities. Of course, puppies may also learn undesirable behaviors from their dams, so attention to the ongoing socialization and general behavioral well-being of dams must be ensured to optimize their ability to produce and rear behaviorally well-adjusted puppies.

Later weaning and separation ages may also yield health benefits. Improved weight gain and growth, decreased illness and mortality, and improved coat condition were found when weaning was delayed from six to 12 weeks of age (Slabbert and Rasa, 1993). No difference was found in bonding with people when two hours of daily human contact were provided beginning at 10 days of age in puppies weaned and separated from their dams at older ages. These results suggest that social bonding with people is not impaired if puppies are weaned and placed in homes at older ages, provided that some social contact with humans is ongoing during this time. Optimizing behavioral development opportunities, nutrition, and the environment can therefore promote dog welfare.

Conclusion

Although the weaning process is a necessary period in every puppy's life, the timing and process of transitioning puppies to solid food and separating them from their dams and littermates must be carefully considered to promote optimal physical and behavioral well-being. While puppies may be able to eat solid food at relatively early ages (three to six weeks), they continue to learn behaviors, critical to their development, from dams and littermates in the sensitive period that occurs in the first nine weeks of life. Consequently, delaying complete separation of puppies from their dams and littermates until later ages (at least eight weeks) may provide

behavioral and health benefits that enable puppies to bond with and make even better companions to their new families.

References

Elliot, O., Scott, J.P., (1961). The Development of Emotional Distress Reactions to Separation, in Puppies. The Journal of Genetic Psychology: Research and Theory on Human Development; 99, 3-22, DOI: 10.1080/00221325.1961.10534386.

Fox, M.W., and Stelzner, D., (1966). Behavioural effects of differential early experience in the dog. Animal Behaviour; 14, 273-281.

Fox, M.W., and Stelzner, D., (1967). The effects of early experience on the development of inter- and intraspecific social relationships in the dog. Animal Behavior; 15, 377-386.

Lauten, S.D., (2006). Nutritional Risks to Large-Breed Dogs: From Weaning to the Geriatric Years. Veterinary Clinics Small Animal Practice; 1345-1359.

Lindsay, S., (2000). Handbook of Applied Dog Behavior and Training: Volume One Adaptation and Learning. Ames, IA: Iowa State Press A Blackwell Publishing Company.

Malm, K., Jensen, P., (1996). Weaning in dogs: within- and between-litter variation in milk and solid food intake. Applied Animal Behaviour Science; 49, 223-235.

Pfaffenberger, C.J., (1963). The New Knowledge of Dog Behavior: New York: Howell Book House.

Serpell, J., & Jagoe, J.A., (1995). Early experience and the development of behavior. In Serpell, J. (Eds.), *The Domestic Dog, its evolution, behavior and interactions with people* (79-102). Cambridge, United Kingdom: Cambridge.

Scott, J.P., Fuller, J.L., (1974). Genetics and the Social Behavior of the Dog. *Chapter 4 Development of Behavior.* Chicago, Illinois: Chicago Press.

Slabbert, J.M., Rasa, O.A.E., (1993). The effect of early separation from the mother on pups in bonding to humans and pup health. Journal of the South African Veterinary Association; 64, 4-8.

Slabbert, J.M., Rasa, O.A.E., (1997). Observational learning of an acquired maternal behaviour pattern by working dog pups: an alternative training method? Applied Animal Behaviour Science; 53, 309-316.

Sept. 2015

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

VA-4-W

EXPERT REVIEWED

Effects of Flooring on Animal Health and Well-Being: Implications for Kenneled Dogs

Candace C. Croney, Courtney L. Daigle, Moriah Hurt and Judith L. Stella, Purdue of College of Veterinary Medicine

Introduction

Interest in improving the welfare of dogs maintained in kennel environments has resulted in debate about the scientific basis for current standards for housing dogs in the United States. The commercial dog breeding industry is widely criticized relative to dog welfare, and dogs' housing conditions often are a focal point. While much attention has focused on the genetic, health, behavioral, and psychological well-being of dogs in these operations (Scott and Fuller, 1965; Hubrecht et al., 1992; Serpell and Jagoe, 1995; McMillan et al., 2011), few studies have focused on the welfare implications of the flooring on which dogs are maintained.

Effects of flooring on animal health and welfare

While little information exists about how kennel flooring affects dog well-being, the effects of flooring on the behavior and welfare of farm animals are well documented. Much of what has been learned from those studies can be applied to dogs kept in kennels.

Studies have shown that some types of farm floors can cause locomotion problems, lameness, injury, overall foot health issues, and animal discomfort (Phillips and Morris, 2001; Telezhenko and Bergsten, 2005; Cook and Nordlund, 2009; KilBride et al., 2009; Hester et al., 2013). These problems often change the behavior of the animals. For example, lame dairy cows spend more time lying (Ito et al., 2010) and less time eating (Galindo and Broom, 2002) than sound cows, while lame chickens choose to lie down while eating instead of standing as their sound counterparts would (Weeks et al., 2000).

Safeguarding good foot health by identifying and using appropriate flooring surfaces is, therefore, a smart investment (Bruijnis et al., 2012) for both animal welfare and economic reasons. Proper foot care and access to appropriate flooring for standing, lying, eliminating, and resting are paramount for good animal welfare as is early identification of potential problems and intervention to prevent long-term foot health issues (Groenevelt et al., 2014).

For example, dairy cows housed on rubber slats were less likely to suffer from foot disease than were cows housed on solid rubber flooring (Hultgren and Bergsten, 2001) while cows housed on concrete were more likely than cows on solid rubber to become lame, develop heel erosions, and have increased rates of claw growth and wear. Additionally, Asian elephants have been observed engaged in more resting and locomotion behaviors on rubber floors than on concrete floors (Meller et al., 2007).

Not only do animals show different physiological responses to different flooring types, but when offered a choice, they often prefer one flooring type over another. For instance, sows exposed to three different types of floors (concrete, plastic coated rod, and galvanized metal rod) preferred concrete floors before delivering their piglets and avoided metal floors afterward (Phillips et al., 1996). Sheared ewes preferred softer floors with lower thermal conductivity (Færevik et al., 2005), and

chickens raised on either litter or wire mesh preferred litter over mesh when given the choice (Dawkins, 1983). These studies demonstrate that animals have preferences for flooring surfaces, and these may change depending on the environment or situation.

Understanding the impacts of flooring to improve dog behavior and welfare

To ensure dog welfare, the flooring chosen for housing of dogs must meet several key criteria. It should allow the dog to separate itself from its excrement, be safe and comfortable for lying, standing, walking and eliminating, and it should be easy to clean.

Dogs confined in an enclosure may spend more time with their feet in contact with urine and feces than they would if not confined. Even when excrement is removed daily, a porous kennel floor may become saturated with urine due to repeated use. When the dog walks on the same surfaces used for urination and defecation, the animal's feet are exposed to these irritants more often than would normally happen. Prolonged exposure of this kind may cause foot health problems. Thus, improper flooring can create unwanted foot health issues (Webb and Nilsson, 1983) that may cause pain and compromise dog welfare.

Safe and species-appropriate flooring is therefore paramount for good foot health. Dogs, like other animals, can slip and fall on uneven or slippery surfaces (Grandin, 1996; Weeks et al., 2002), and the texture of the flooring may impact gait (Flower et al., 2007) as well as foot wear and tear (Newton et al., 1980). Additionally, a surface's material, slope, texture, and finish all affect the animals' comfort and health. If the flooring is difficult to walk on, a dog may alter its gait in adaptation, and that can, in turn, cause joint and mobility problems. Further, some flooring materials may harbor bacteria or may be more difficult to sanitize, which could lead to greater risk of disease.

Currently, information is scarce on the effects of flooring surfaces on dogs of different breeds and sizes.

Concrete and PVC-coated, diamond-shaped wire mesh flooring are common flooring materials used by commercial dog breeders, distributors of dogs, and retail pet stores. These types of flooring are often used in laboratory settings as well. Surprisingly, however, few studies appear to have examined the effects of these or any flooring surfaces on dog behavior, health, and overall well-being. Consequently, although some groups oppose the use of coated wire flooring for long- and even short-term housing of dogs, the basis for mandating for or against them seems ambiguous at best.

Only one study (Kovacs et al., 2005) has examined the relationship between flooring and any aspect of dog health. However, assessing the effects of flooring was not the focus of the study; instead, flooring was only one of many factors that appeared to contribute to interdigital interdigital cysts in adult beagles. While the occurrence of cysts increased as dogs spent more time on every type of flooring evaluated (PVC-coated wire mesh floors; flat bar steel, uncoated; and flat bar, PVC-coated), the occurrence of cysts was lowest (8%) in dogs kept on PVC-coated wire mesh. At first glance, this might appear to contradict objections to coated wire mesh flooring, but a more comprehensive examination of the effects of this material on dog foot health, along with other commonly used surfaces, is essential before conclusions and recommendations can be made as to their suitability for dogs in both the short- and long-term.

Establishing guidelines for appropriate flooring for dogs

As has been demonstrated in other animals, flooring is important to dog welfare, and many factors must be considered when selecting an appropriate flooring surface for them. Where some guidance exists in regard to appropriate flooring types, the scientific basis for the recommendations is often questionable. For example, the *Guide for the Care and Use of Laboratory Animals* (NRC, 2013) states only that "flooring should be solid,

perforated, or slatted with a slip-resistant surface" and recommends that solid resting areas may be useful when wire mesh flooring is used, given the risk of foot lesion development in rodents and rabbits (NRC, 2013). The *Guidelines for Standards of Care in Animal Shelters* (Newbury et al., 2010) indicate that non-porous flooring surfaces should be used and that these should be easy to clean and disinfect, and able to withstand repeated cleaning. Additionally, they list wire-mesh or slatted cage floors as unacceptable surfaces. However, no supporting citation for the guidance is provided.

It is evident, therefore, that more research is needed to identify the effects of different flooring surfaces on dog health, preference, and comfort. A better understanding of the flooring type(s) dogs prefer for resting, standing, and eliminating—and which floors minimize injuries and other health risks—is needed to inform recommendations for the types of flooring that are most appropriate for dogs of various ages, conditions, breeds, and weights.

References

Bruijnis, M., Beerda, B., Hogeveen, H., Stassen, E., 2012. Assessing the welfare impact of foot disorders in dairy cattle by a modeling approach. *animal* 6, 962-970.

Cook, N.B., Nordlund, K.V., 2009. The influence of the environment on dairy cow behavior, claw health and herd lameness dynamics. *The Veterinary Journal* 179, 360-369.

Dawkins, M.S., 1983. Cage size and flooring preferences in litter-reared and cage-reared hens. British Poultry Science 24, 177-182.

Færevik, G., Andersen, I.L., Bøe, K.E., 2005. Preferences of sheep for different types of pen flooring. *Applied Animal Behaviour Science* 90, 265-276.

Flower, F.C., de Passille, A.M., Weary, D.M., Sanderson, D.J., Rushen, J., 2007. Softer, higher-friction flooring improves gait of cows with and without sole ulcers. *Journal of Dairy Science* 90, 1235-1242.

Galindo, F., Broom, D.M., 2002. The effects of lameness on social and individual behavior of dairy cows. *Journal of Applied Animal Welfare Science* 5, 193-201.

Grandin, T., 1996. Factors that impede animal movement at slaughter plants. *Journal of the American Veterinary Medical Association* 209, 757-759.

Groenevelt, M., Main, D., Tisdall, D., Knowles, T., Bell, N., 2014. Measuring the response to therapeutic foot trimming in dairy cows with fortnightly lameness scoring. *The Veterinary Journal.*

Hester, P., Enneking, S., Jefferson-Moore, K., Einstein, M., Cheng, H., Rubin, D., 2013. The effect of perches in cages during pullet rearing and egg laying on hen performance, foot health, and plumage. *Poultry Science* 92, 310-320.

Hubrecht, R.C., Serpell, J.A., Poole, T.B., 1992. Correlates of pen size and housing conditions on the behaviour of kennelled dogs. *Applied Animal Behaviour Science* 34, 365-383.

Hultgren, J., Bergsten, C., 2001. Effects of a rubber-slatted flooring system on cleanliness and foot health in tied dairy cows. *Preventive Veterinary Medicine* 52, 75-89.

Ito, K., Von Keyserlingk, M., LeBlanc, S., Weary, D., 2010. Lying behavior as an indicator of lameness in dairy cows. *Journal of Dairy Science* 93, 3553-3560.

KilBride, A.L., Gillman, C.E., Ossent, P., Green, L.E., 2009. A cross sectional study of prevalence, risk factors, population attributable fractions and pathology for foot and limb lesions in preweaning piglets on commercial farms in England. *BMC Veterinary Research* 5, 31.

Kovacs, M.S., McKiernan, S., Potter, D.M., Chilappagari, S., 2005. An epidemiological study of interdigital cysts in a research beagle colony. *Journal of the American Association for Laboratory Animal Science* 44, 17-21.

McMillan, F.D., Duffy, D.L., Serpell, J.A., 2011. Mental health of dogs formerly used as 'breeding stock' in commercial breeding establishments. *Applied Animal Behaviour Science* 135, 86-94.

Meller, C.L., Croney, C.C., Shepherdson, D., 2007. Effects of rubberized flooring on Asian elephant behavior in captivity. *Zoo Biology* 26, 51-61.

Newbury, Sandra, ed., 2010. *Guidelines for Standards of Care in Animal Shelters.* Association of Shelter Veterinarians.

Newton, G.L., Booram, C.V., Hale, O.M., Mullinix, B.G., Jr., 1980. Effect of four types of floor slats on certain feet characteristics and performance of swine. *Journal of Animal Science* 50, 7-20.

NRC, 2013. *Guide for the Care and Use of Laboratory Animals: Eighth Edition.* National Academies Press.

Phillips, C., Morris, I., 2001. The locomotion of dairy cows on floor surfaces with different frictional properties. *Journal of Dairy Science* 84, 623-628.

Phillips, P.A., Fraser, D., Thompson, B.K., 1996. Sow preference for types of flooring in farrowing crates. *Canadian Journal of Animal Science* 76, 485-489.

Scott, J.P., Fuller, J., 1965. *Genetics and the Social Behavior of the Dog*. University of Chicago Press.

Serpell, J., Jagoe, J., 1995. Early experience and the development of behaviour. *The Domestic Dog: Its Evolution, Behaviour, and Interactions with People*, 79-102.

Telezhenko, E., Bergsten, C., 2005. Influence of floor type on the locomotion of dairy cows. *Applied Animal Behaviour Science* 93, 183-197.

Webb, N., Nilsson, C., 1983. Flooring and injury–an overview. *Farm Animal Housing and Welfare*, 226-259.

Weeks, C., Danbury, T., Davies, H., Hunt, P., Kestin, S., 2000. The behaviour of broiler chickens and its modification by lameness. *Applied Animal Behaviour Science* 67, 111-125.

Weeks, C., McNally, P., Warriss, P., 2002. Influence of the design of facilities at auction markets and animal handling procedures on bruising in cattle. *Veterinary Record* 150, 743-748.

Mar. 2015

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension • The Education Store
www.edustore.purdue.edu

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

VA-2-W

EXPERT REVIEWED

Promoting the Welfare of Kenneled Dogs: Space Allocations and Exercise

Moriah Hurt, Courtney Daigle, and Candace Croney, Purdue College of Veterinary Medicine

Introduction

While it is critically important to meet dogs' basic needs for food, water, shelter, and appropriate healthcare in any environment, dogs maintained long-term in kennels require substantially more than a balanced diet and a clean environment. Good animal welfare extends beyond basic biological functioning; we must assess the dogs' environments comprehensively. Evaluating and protecting the welfare of kenneled dogs depends on our understanding of all their physical and behavioral needs. Ensuring that dogs' behavioral and psychological welfare needs are met is essential to providing an environment where dogs can thrive. Consequently, we must consider many different aspects of dogs' environments both inside and outside of kennels.

Space and Exercise

Research to establish optimal or dog-preferred kennel size is in its infancy. The U.S. Department of Agriculture and Animal Welfare Act's size requirements for kenneled dogs are based upon the estimated dynamic space a dog needs to "comfortably sit, stand, and lie in a normal manner and to turn about freely" (AWA, 1985). While this takes a common-sense approach to estimating kennel size requirements, few studies have been able to clearly quantify the optimal kennel size for dogs.

Current USDA floor area (ft^2) recommendations (AWA, 1985; *NRC, 2010*) for singly housed dogs are:

- Dog weight < 33 lbs: 8.0 ft^2
- Dog weight 33–66 lbs: 12.0 ft^2
- Dog weight > 66 lbs: 24.0 ft^2

Space requirements for dogs have also been outlined based on the length of the dog. For example, the USDA APHIS Animal Welfare regulation (1998 amendment) pertaining to space requirements for primary enclosures for dogs states:

"(i) Each dog housed in a primary enclosure (including weaned puppies) must be provided a minimum amount of floor space, calculated as follows: Find the mathematical square of the sum of the length of the dog in inches (measured from the tip of its nose to the base of its tail) plus 6 inches; then divide the product by 144. The calculation is: (length of dog in inches + 6) × (length of dog in inches + 6) = required floor space in square inches. Required floor space in inches/144 = required floor space in square feet. (ii) Each bitch with nursing puppies must be provided with an additional amount of floor space, based on her breed and behavioral characteristics, and in accordance with generally accepted husbandry practices as determined by the attending veterinarian."

While these space allowances may be reasonable, there is insufficient scientific basis to support them. Very few research studies have examined what types of space dogs prefer and how space needs may change as a function of the age, breed, size, gender, or physical status of the dog, or as a function of the type of accommodations and resources provided (Coppinger and Zuccotti, 1999).

Therefore, further evaluation is necessary to address the spatial needs of kenneled dogs. Conflicting results have

been reported in existing studies. Some studies report that dogs are relatively inactive inside kennels (Hubrecht et al., 1992; Bebak and Beck, 1993) suggesting that dogs do not need to be housed in large kennels. However, other studies have shown that when dogs are provided with more kennel space, they are more active (e.g., a dog housed in a 10.8 ft^2 kennel traveled 500 m/day compared to 4,000 m/day for a dog housed in a 75.3 ft^2 kennel during the same 12-hour period), even though they spend the same time per day engaged in activity (Hughes et al., 1989).

Further, dogs housed as a pair in a 193.8 ft^2 enclosure were 1.34 times more likely to be active than a single dog housed in a 96.9 ft^2 kennel (Normando et al., 2014). This suggests that kennel size can indeed influence the behavior of kenneled dogs, not simply because greater space allocation affords more activity, but also because it increases the potential for dogs to display a greater diversity of natural behaviors. However, the conflicting findings on space allocations and their effects on kenneled dogs complicate the challenge of determining an ideal kennel size.

In addition, studies aimed at optimizing kennel size have not approached the question systematically. The amount of space allotted to dogs varies in the experimental treatments in different studies. Differences also exist in how activity is defined. In some instances, stereotypic behaviors such as pacing and circling are included, while in others such behaviors are excluded from the analysis. Studies that analyze how different kennel sizes and types impact the dog's entire behavioral repertoire and use of space are needed.

Several studies have begun to address how dogs choose to use the space provided. Consequently, it has been established that dogs prefer to eliminate away from the areas where they eat, drink, and sleep (Wagner et al., 2014), and that dogs perform fewer stereotypic behaviors when in social groups compared to when they are alone (Mertens and Unshelm, 1996). In addition, the presence of environmental enrichment (e.g., toys) can facilitate the performance of a wider variety of natural behaviors when dogs are held in larger enclosures (Schipper et al., 2008; Normando et al., 2014).

However, addressing kennel size alone is not enough to optimize dog welfare. Although appropriate space allotments for primary housing areas within the kennel are paramount to good animal care, the amount and quality of time the dog spends outside of the kennel is also important. Dogs should be given access to exercises spaces that are large enough to allow them to extend to full stride while running and playing, as these behaviors facilitate positive emotional as well as physical states in dogs. In addition to the amount of space provided, the number and sizes of dogs within the space may affect how dogs use the space within the kennel and outdoor environments.

Just as having a gym membership does not ensure good muscle tone and fitness, providing space for exercise does not guarantee that dogs are exercising. Therefore, it is important that caretakers monitor dogs and, when necessary, facilitate their exercise.

Conclusion

Proper care for kenneled dogs goes beyond a clean environment and sufficient food and water. Dogs also require sufficient space and exercise geared to promote their mental and physical health. Further studies are needed to examine the basis for current space requirements and the extent to which these meet the welfare requirements of dogs housed singly and in groups. In addition, researchers need to examine the ability of dogs to exercise in their primary enclosures and in dedicated exercise spaces as a function of their allocated space.

References

AWA, 1985. Animal Welfare Act, In: Agriculture, U.S.D.o. (Ed.), H.R. 13881.

Bebak, J., Beck, A., 1993. The effect of cage size on play and aggression between dogs in purpose-bred beagles. *Laboratory Animal Science* 43, 457-459.

Coppinger, R., Zuccotti, J., 1999. Kennel enrichment: Exercise and socialization of dogs. *Journal of Applied Animal Welfare Science* 2, 281-296.

Hubrecht, R.C., Serpell, J.A., Poole, T.B., 1992. Correlates of pen size and housing conditions on the behaviour of kennelled dogs. *Applied Animal Behaviour Science* 34, 365-383.

Hughes, H., Campbell, S., Kenney, C., 1989. The effects of cage size and pair housing on exercise of beagle dogs. *Laboratory Animal Science* 39, 302-305.

Mertens, P.A., Unshelm, J., 1996. Effects of group and individual housing on the behavior of kennelled dogs in animal shelters. *Anthrozoos* 9, 40-51.

Normando, S., Contiero, B., Marchesini, G., Ricci, R., 2014. Effects of space allowance on the behaviour of long-term housed shelter dogs. *Behavioural Processes* 103, 306-314.

NRC, 2010. *Guide for the Care and Use of Laboratory Animals: Eighth Edition*. National Academies Press.

Schipper, L.L., Vinke, C.M., Schilder, M.B., Spruijt, B.M., 2008. The effect of feeding enrichment toys on the behaviour of kennelled dogs (*Canis familiaris*). *Applied Animal Behaviour Science* 114, 182-195.

USDA APHIS Animal Welfare Act Regulation 9 CFR 3.6(c). 1998. http://www.gpo.gov/fdsys/pkg/CFR-2013-title9-vol1/xml/CFR-2013-title9-vol1-chapI-subchapA.xml. Accessed January 1, 2015.

Wagner, D., Newbury, S., Kass, P., Hurley, K., 2014. Elimination Behavior of Shelter Dogs Housed in Double Compartment Kennels. *PLOS ONE 9*, e96254.

Feb. 2015

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

VA-18-W

EXPERT REVIEWED

Auditory Stress: Implications for Kenneled Dog Welfare

Morgan Garvey, Judith Stella and Candace Croney,
Department of Comparative Pathobiology, College of Veterinary Medicine, Purdue University

Introduction

Dogs in kennels often are exposed to noise levels known to be stressful to animals. Such levels may negatively impact their welfare. Several studies suggest that prolonged exposure to loud noises can cause hearing impairment or even total loss in humans. Because the auditory systems of humans and dogs are similar, noise levels that damage human hearing may have similar adverse effects on dogs. Despite the similarities, dogs are able to detect sounds ranging in frequency from 40 Hz to 50 kHz, while humans can hear up to only 20 kHz. That suggests dogs may be even more at risk of noise distress than people experiencing the same environments. Exposure to hazardous noise levels can not only cause hearing damage but lead to behavioral and physiological responses, such as a suppressed immune system, insulin resistance, cardiovascular disease and intestinal problems (Coppola et al., 2006). However, few studies have investigated the effects of auditory stress on kenneled dogs.

Sources of noise in kennels

Most noise in dog kennels is produced by dogs. Sales et al. (1997) have reported that the bark of a single dog can reach 100 dB, and recorded sound levels can range between 85 and 122 dB in kennels. Barking by one dog may become a self-reinforcing behavior and may also stimulate other individuals to vocalize further. Additionally, dogs housed in kennels may bark as a territorial behavior or from excitement generated by people passing by the pens. Routine husbandry may also have some effect on barking. For example, dogs that anticipate activities such as the daily arrival of staff may begin to bark around the same time each day in an attempt to solicit food or attention from caretakers.

Another source of noise in kennels is from equipment and husbandry procedures, some of which may be inaudible to people. For example, use of high-pressure water hoses during cleaning will emit sound in the ultrasonic range which may reach 90 dB (Coppola et al., 2006). Other noise-emitting equipment

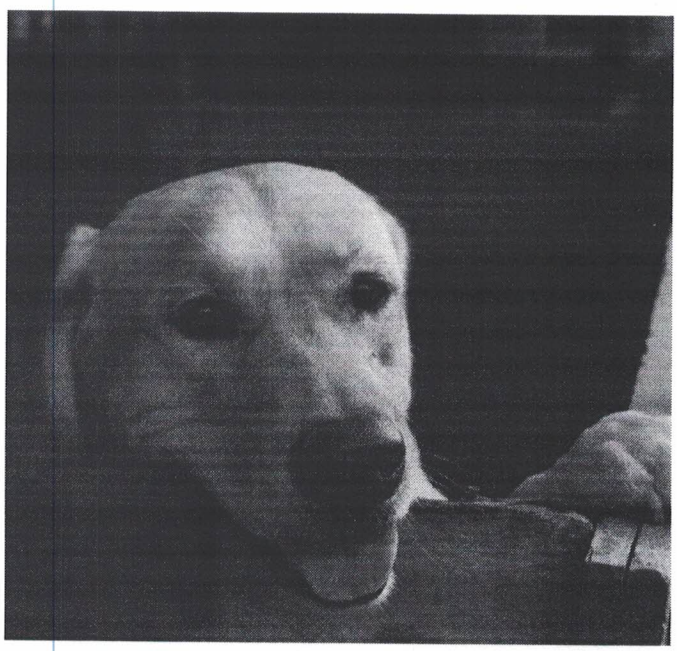
in the kennel environment includes refrigerators, ventilation systems, temperature regulating systems, and noise made by food and water bowls, as well as doors and nearby motor vehicle traffic.

Negative impacts of high noise levels on people and dogs

Physiological stress responses to noise levels of 100-110 dB have been documented in rodents (Cappert et al., 2000). In humans, hearing loss has been reported at 85 dB; exposure to sounds greater than 90 dB for longer than 8 hours can result in serious hearing damage. Exposure to sounds above 140 dB can cause immediate damage and physical pain. Sound levels ranging from 85-100 dB are common in dog kennels. Exposure to these high levels of sound throughout the day puts both animals and humans at risk for damage to their hearing and may result in decreased quality and quantity of sleep in dogs. An unpleasantly noisy environment can result in reduced reproductive and cardiovascular function, disturbed sleep-wake cycles, or a limited ability to communicate with other dogs (Wells, 2009).

Decreasing kennel noise

Given the risks associated with noise distress, it is important to consider ways to minimize kennel noise. Modifying kennel management procedures or incorporating sound control into construction of new buildings are among several ways of doing so. Reducing the number of interruptions in the kennel and setting a regular care schedule may decrease barking. Replacing squeaky kennel doors and loud overhead fans, and using quieter cleaning equipment may all help to decrease the level of noise within the facility. Another intervention, if budgets allow, is the use of sound absorbing materials. Materials such as concrete block walls and floors, and metal or hard ceilings do not absorb noise but, instead, reflect it. Because these materials are routinely used in kennels, noise abatement, when not cost prohibitive, should be considered. Sound-dampening materials that can be incorporated into kennel design include noise abatement paneling, hanging baffling and sound clips. Because incorporating such materials can be impractical and costly, in newer facility designs, self-contained rooms may be incorporated as an alternative to traditional kennels and runs as a means of reducing noise. Such rooms typically are enclosed within a larger area with the noise absorbed and contained within the smaller rooms. Additionally, dogs can be housed in groups within these self-contained rooms, which has been shown to decrease noise caused by vocalization and increase the time spent sleeping (Coppola et al., 2006). However, for many facilities, such as high-volume or low-resource shelters or kennels, self-contained rooms may not be feasible due to their relatively high costs and impracticality for housing large numbers of dogs.



Using environmental enrichment for noise abatement

Environmental enrichment can provide an effective intervention to decrease barking and, therefore, lower kennel noise. Auditory enrichment programs have been used to decrease barking in kennels. The demonstrated benefits of auditory stimulation have led to the development of music selections created specifically to enhance companion animal well-being. For example, playing classical music in a kennel can promote restful behaviors often associated with reduced stress levels, thereby reducing some of the negative aspects of the kennel environment at relatively minimal cost and effort (Kogan et al., 2012). In addition, the music may have a positive effect on human caretakers by creating a more relaxing work environment. The use of radio broadcasts has also been shown to have beneficial effects on captive animals by masking distractive noises (Wells, 2009). More recently, commercially available psycho-acoustically designed classical music CDs, such as "Through a Dog's Ear," have become popular for use in various companion animal environments. Use of these albums in shelters, clinics, and home settings have been proven to help calm dogs with anxiety (Leeds and Wagner, 2005).

Another type of enrichment that may reduce barking is olfactory enrichment. For example, Dog Appeasement Pheromone (DAP), a synthetic version of a pheromone that is produced by bitches shortly after whelping, has a calming effect on newborn puppies and has been found to decrease problem behaviors in dogs. Wells (2009) reported that dogs in shelters decreased barking after being exposed to DAP for

seven days. DAP is commercially available as a collar, diffuser or spray. The use of essential oils and other plant-based odors has also been found to have beneficial effects on animals that may lead to reduced noise. Lavender and chamomile have been shown to decrease activity and vocalizations that are indicative of relaxation in shelter dogs (Wells, 2009). Scented cloths and diffusers can be used to reduce barking and other activities that result from over-excitement or distress in kenneled dogs.

Conclusions

Auditory stress for kenneled dogs is a serious welfare concern that requires more investigation. An unpleasantly noisy environment can result in altered immune function, disturbed sleep-wake cycles, and possibly, hearing damage or loss to dogs and people. Therefore, it is important to monitor and reduce noise levels in kennels. Sound monitoring equipment is available to determine the level of environmental noise, but can be expensive. However, sound detector apps now available on cellphones may provide a cost-effective and practical way to monitor the intensity of sounds in the kennels. For kennels that are found to be excessively noisy, there are several ways to improve the auditory environment at relatively low cost, time and effort. Attending to noise levels in kennels and reducing the auditory stress that kenneled dogs experience may help to create a more positive environment that results in better health and welfare outcomes for dogs as well as people.

References

Brayley, C., Montrose, V.T. 2016. The effects of audiobooks on the behavior of dogs at a rehoming kennel. *Applied Animal Behaviour Science 174, 111-115.*

Cappert, N.L., Klis, S.F., Muijser, H., Kulig, B.M., Smoorenburg, G.F. 2000. Noise Induced Hearing Loss in Rats. *Noise & Health 9, 23-32.*

Coppola, C., Enns, R.M., Grandin, T. 2006. Noise in Animal Shelter environment: Building design and the effects of daily noise exposure. *Journal of Applied Animal Welfare Science 9, 1-7.*

Derschel, N.A. 2010. The effects of fear and anxiety on health and lifespan in pet dogs. *Applied Animal Behaviour Science 125, 157-162.*

Kogan L.R., Schoenfeld-Tacher, R., Simon, A.A. 2012. Behavioral effects of auditory stimulation. *Journal of Veterinary Behavior 7, 268-275.*

Leeds, J. and Wagner, S. 2008. Through a dog's ear: using sound to improve the health and behavior of your canine companion. Sounds True, Boulder, CO.

Sales, G., Hubrect, R., Peyvandi, A., Milligan, S., Shield, B. 1997. Noise in dog kenneling: Is barking a welfare problem for dogs? *Applied Animal Behavior Science 52, 321-329.*

Scheifele P., Martin, D., Clark, J.G., Kemper, D., Wells, J. 2012. The effect of kennel noise on hearing in dogs. *American Journal of Veterinary Research 73, 482-489.*

Wells, D.L. 2009. Sensory stimulation as environmental enrichment for captive animals. *Applied Animal Behavior Science 118, 1-11.*

Dec. 2016

PURDUE UNIVERSITY

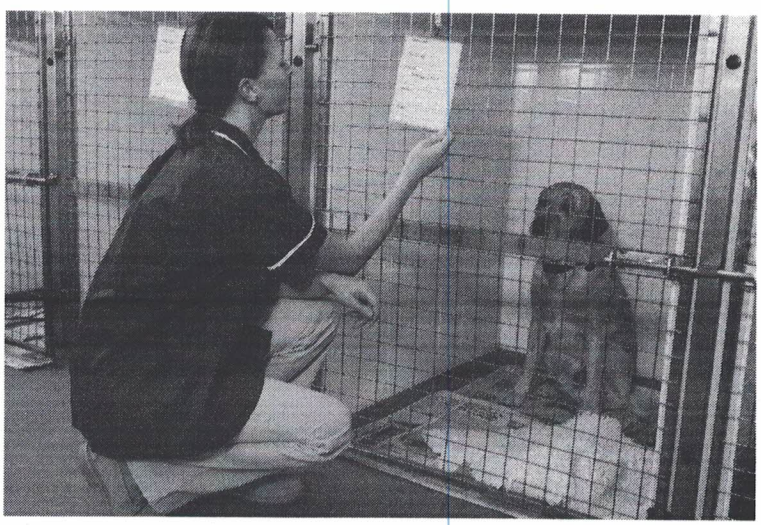
PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu

Assessing Kennel Dog Welfare

Moriah Hurt, Judith Stella and Candace Croney, Purdue College of Veterinary Medicine

Introduction



For many dogs, time in a kennel often means a brief stay in a veterinary hospital or boarding facility. In breeding kennels and animal shelters, as well as sites where dogs are used for research, time is measured in weeks, even years. Upon entering a kennel environment, dogs may be confronted with stressful situations, such as new environmental events, sounds, or smells, separation from familiar kennel mates or caretakers, as well as confinement in a run or cage. As a result, some dogs may experience fear, boredom, frustration or social isolation, which may result in poor welfare.

On the other hand, it is important to know when dogs are doing well so that positive states can be maintained and promoted. Knowledgeable caretakers can impact the health and well-being of dogs by identifying and attending to signs of poor as well as positive welfare states. Regardless of the causes of a dog's state of being, it is important for those who work with dogs to be aware of key indicators of both positive and negative well-being.

Behavioral indicators of fear and anxiety

Dogs can display a variety of behaviors to indicate a fearful or anxious emotional state. In general, fearful animals do not tend to approach unfamiliar objects or people. Previous experiences, including their history of socialization, can contribute to the level of fear dogs feel and exhibit in kennel environments. For example, interactions with caretakers during handling or training can either increase or decrease the likelihood of a dog approaching a person. Also, dogs trained using punishment-based techniques interact less with strangers (Rooney and Cowan, 2011).

Regardless as to why dogs may show fear when kept in kennels, recognizing when they are fearful, and then intervening appropriately, can help to protect them and their caretakers. Fearful dogs may respond with an increase in aggression, preventing staff from properly caring for them (Yin, 2009). Thus, caretakers who are able to identify these behaviors, or "read dog body language," are better able to predict a dog's behavior, make adjustments to their own behavior for safer handling, or modify the environment so that the dog feels safer.

Recognizing fear is also important because wound healing in fearful dogs may be slower, dogs could also have reproductive difficulties (McGrady, 1984; von Borell, 1995) and be viewed as less desirable by potential adopters (Weiss et al., 2012). Key behavioral indicators of fear or anxiety in dogs include low body posture (staying low to the ground), tail tucked between legs, shaking or trembling, panting, paw lifting, lip licking (Beerda et al., 1997), inappropriate urination (healthy, house-trained dogs urinating in undesirable or unusual places) as well as frequent expression of the anal glands in concert with other behavioral indicators of fearfulness.

Another behavior that may result from fear or anxiety is destruction of the dog's enclosure. Destruction of the environment (for example, bedding or kennel walls) may occur as a result of frustration due to inability to perform important, breed-specific behaviors (e.g., terriers that have no means to express digging behaviors) or as a result of a dog attempting to escape or trying to access a social contact, such as a kennel mate or familiar person.

Stereotypies and other abnormal behaviors

Stereotypies are repetitive behaviors that serve no obvious function or purpose and that are consistently repeated in the same pattern. Common stereotypies in dogs include pacing, circling, whirling and "wall bouncing". Other abnormal behaviors that are typically indicative of a poor state of being in dogs include self-biting, polydipsia (abnormal or excessive consumption of water) or polyphagia (excessive or increased appetite), and compulsive staring (Hubrecht, 1995). Some dogs may begin to groom themselves excessively, focusing particularly on their front legs and feet. This can result in development of a lick granuloma, a type of lesion that can be continuously irritated if the behavior is ongoing. In general, stereotypies and other abnormal behaviors should be taken seriously, as they not only indicate failure to cope with the environment but can also result in injuries, such as to the paws from repetitive pacing. Caretakers should record any abnormal occurrences to help identify the presence, development and persistence of these behaviors.

Vocalizations

Vocalizations can help in assessing both positive and negative aspects of kennel dog welfare, but context must be accounted for when interpreting them. For example, during play, dogs can bark, growl, or whine (Simonet et al., 2001), all indicating a positive emotional state. Alternatively, growling in the absence of play may indicate fear and an intention to engage in defensive aggression. Vocalizations such as increased whining or barking may indicate distress from environmental factors, including loud noises, an unfamiliar object or person, or social isolation (Hetts et al., 1992). Physical influences (e.g. pain) can also elicit vocalizations such as yelping or whining.

Excessive barking, which can occur in kennels, may indicate that dogs are experiencing poor welfare states, such as boredom, frustration or loneliness. Such behavior can negatively impact other dogs by preventing them from resting and by causing noise levels to increase to the point where resident dogs develop hearing loss.

Sickness behaviors

Sickness behaviors refer to a group of non-specific clinical and behavioral signs that correspond to a well-documented physiological and behavioral response to infection (Broom, 2006). When an animal contracts an infectious disease, it will typically show a decrease in activity or appear lethargic, reduce food intake, and might remove itself from the social group. This is an adaptive response to conserve the body's resources to fight disease and promote recovery from infection (Dantzer et al., 2008). Interestingly, these same behaviors have been shown in response to environmental and psychological stressors. These behaviors can be used to identify animals that are not coping well with their environments. In dogs, decreased activity, anorexia (Casey, 2002) and withdrawal are typical examples of sickness behaviors. Because these behaviors may also be indicative of pain, it is important to investigate their causes so that proper care can be provided.

Other Indicators of positive welfare

It is important that dogs experience positive well-being and that caretakers are able to identify and promote these states in addition to attending to signs of poor welfare. A relaxed mouth and ears, soft eyes, weight carried evenly on all four limbs, and a neutral tail posture (i.e. tail is level with the body or hanging down loosely) are all indicators of a comfortable dog that is at ease in its environment (Yin, 2009). Certain behaviors, such as play, are observed only in dogs experiencing positive welfare. Soliciting play with caretakers or other dogs (e.g., via species-typical postures, such as play bows) can therefore be a good indicator that a dog feels comfortable in its environment, particularly if the behavior is reciprocated and play ensues. It may help if dogs have familiar toys from home available for play. Play is more common in younger animals, but adult dogs also play when their needs are met (Boissy et al., 2007) and they are experiencing positive emotional states.

Although it is important to look for behavioral signs of dog welfare, indicators of physical and physiological state are equally important. For example, normal body condition score (neither too thin nor overweight) can

indicate good health. Other physical indicators of good general health include a thick, shiny coat free from dander and excess shedding, firm stool, absence of wounds or lesions, and absence of respiratory symptoms, such as coughing, sneezing, and nasal and ocular discharge. Normal respiratory and heart rates and good immune function also indicate physical well-being in dogs.

Conclusion

Understanding the broad range of indicators of dog well-being is essential for caretakers or anyone in contact with kenneled dogs. Awareness of how negative and positive welfare states can manifest can help caretakers better understand how well individual dogs are doing in specific situations. Recording behaviors such as stereotypies, vocalizations, sickness behaviors or play can aid staff in identifying changes in a dog's normal behavior and allow early intervention for dogs that are experiencing distress, pain, illness or injury. However, because dogs are likely to show individual variation in their responses to environments, knowing what is normal for each dog can help caretakers identify changes that reflect differences in their welfare states.

References

Beerda, B., Schilder, M., Van Hooff, J., de Vries, H., (1997). Manifestations of chronic and acute stress in dogs. Applied Animal Behavior Science; 52, 307-319.

Boissy, A., Manteuffel, G., Jensen, M.B., Moe, R.O., Spruijt, B., Keeling, L.J., Winckler, C., Forkman, B., Dimitrov, I., Langbein, J., Bakken, M., Veissier, I., Aubert, A., (2007). Assessment of positive emotions in animals to improve their welfare. Physiology & Behavior; 92, 375-397.

Broom, D.M., (2006). Behaviour and welfare in relation to pathology. Applied Animal Behaviour Science; 97, 73-83.

Casey, R., (2002). Fear and Stress. In Horwitz, D., Mills, D., Heath, S., (Eds.). BSAVA Manual: Canine and Feline Behavioural Medicine (pp. 144-153). Quedgeley, Gloucester: British Small Animal Veterinary Association.

Dantzer, R., O'Connor, J.C., Freund, G.G., Johnson, R.W., Kelley, K.W., (2008). From inflammation to sickness and depression: when the immune system subjugates the brain. Neuroscience; 9, 46-57.

Hetts, S., Clark, D.J., Calpin, J.P., Arnold, C.E., Mateo, J.M., (1992). Influence of housing conditions on beagle behaviour. Applied Animal Behaviour Science; 34, 137-155.

Hubrecht, R., (1995). The welfare of dogs in human care. In Serpell, J., (Eds.), *The domestic dog: Its evolution, behaviour, and interactions with people* (179-198). Cambridge: Cambridge University Press.

McGrady, A.V., (1984). Effects of Psychological Stress on Male Reproduction: A Review. Archives of Andrology; 13, 1-7.

Rooney, N.J., Cowan, S., (2011) Training methods and owner-dog interactions: links with dog behavior and learning ability. Applied Animal Behaviour Science; 132, 169-177.

Simonet, P.R., Murphy, M., Lance, A., (2001). *Laughing dog: Vocalizations of domestic dogs during play encounters.* Paper presented at the meeting of Animal Behavior Society, Corvallis, OR.

von Borell, E., (1995). Neuroendocrine integration of stress and significance of stress for the performance of farm animals. Applied Animal Behaviour Science; 44, 219-227.

Weiss, E., Miller, K., Mohon-Gibbons, H., Vela, C., (2012). Why Did You Choose This Pet? : Adopters and Pet Selection Preferences in Five Animal Shelters in the United States. Animals; 2, 144-159.

Yin, S. (2009). Low Stress Handling, Restraint and Behavior Modification of Dogs and Cats: Techniques For Developing Patients Who Love Their Visits. Davis, CA: Cattle Dog Publishing.

Aug. 2015

PURDUE UNIVERSITY

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS
1-888-EXT-INFO · www.extension.purdue.edu

Order or download materials from
Purdue Extension · The Education Store
www.edustore.purdue.edu