

Calcium in Homemade Dog Food

Many owners feed their dogs a home-prepared diet. But if they haven't included the right amount of calcium, they may do more harm than good.

By **Mary Straus** - Published: May 28, 2019



If you feed your dog a home-prepared diet, and you do not include a source of calcium, you could be seriously endangering your dog's health. The ingredients shown here are the basis of a very healthy diet – but without the ground eggshell added in, the diet would be incomplete and imbalanced.

If asked the most common mistake people make when feeding their dogs a homemade diet, I'd have to say that it's not adding calcium. This error is not only common, it's also dangerous, especially for puppies, but for adult dogs as well when too little calcium is given long term. Giving an inappropriate amount of calcium (either too much or too little) can cause orthopedic problems in growing puppies, especially large-breed puppies during the first six months when they are growing the fastest. But giving too little calcium can lead to bone disease and more in adult dogs, too.

It's not surprising to me that many people do not realize the importance of adding calcium when feeding a homemade diet. Most of the homemade diet recipes I've seen online make no mention of added calcium. I reviewed more than 30 books on homemade diets for WDJ some years ago.¹ Of the 24 books I reviewed that were not exclusively about feeding a raw diet that includes bones, only 10 included adequate calcium guidelines!

Why Calcium is Important in Dog Nutrition

I'm aware that some people who feed [home-prepared diets](#) rely on annual blood tests to indicate whether their dogs are receiving enough calcium; they think that if their dogs' blood calcium levels

are normal, the dogs must be getting the right amount of calcium in their diet. Unfortunately, this is not true.

For both dogs and humans, the body must keep calcium levels in the blood within a specific range to prevent serious health issues, including loss of muscle control, [seizures](#), and even death. Adult dogs are able to control their blood calcium levels by absorbing a greater or lesser percentage of dietary calcium, depending on the amount fed, though this can be impacted by the amount of vitamin D in the diet as well, as [vitamin D](#) promotes calcium absorption. Note that puppies do not have the ability to control their absorption of calcium before puberty, and thus can suffer the negative effects of too little or too much calcium and vitamin D very quickly.

than one large one!

Dogs (and humans) also control their blood calcium levels by storing calcium in bones, then drawing it back out when needed – when they aren't getting enough calcium in their diet. When adult dogs are given too little calcium for long periods (like months), they develop a condition called nutritional secondary hyperparathyroidism. In this situation, the body produces excess parathyroid hormone to draw needed calcium from their bones, which can also result in elevated levels of phosphorus in the blood.

Parathyroid hormone is completely different from thyroid hormones; the name is given because the parathyroid glands are located adjacent to the thyroid glands. Parathyroid hormones are responsible for regulating calcium and phosphorus levels in the blood. Hyperparathyroidism (too much parathyroid hormone) can also be caused by a tumor on one of the parathyroid glands (primary hyperparathyroidism) or by advanced [kidney disease](#) (renal secondary hyperparathyroidism). Nutritional secondary hyperparathyroidism is usually linked to a deficiency of calcium, sometimes combined with too little vitamin D.

When the body produces too much parathyroid hormone, it causes demineralization of the bones, which may result in lameness, bone pain, swelling, stiffness or [limping](#), not wanting to move, and even spontaneous fractures. Adult dogs may develop spinal deformities, loose teeth, or neurological signs. Puppies are more likely to develop deformities in their legs and joints that may leave them unable to walk normally. If the condition is not corrected quickly, it could lead to long-term orthopedic disorders.

Now that I have scared the pants off you about providing the right amount of calcium in your dog's homemade diet – at least, I hope I did! – what kind of calcium should you add, and how much is the right amount?

When You DON'T Need to Add Calcium to Your Dog's Food

Never add calcium to commercial diets that are “complete and balanced” – these already contain the right amount of calcium! Adding calcium to a “complete and balanced” diet would be particularly dangerous for large-breed puppies.

However, most homemade diets require added calcium with a few notable exceptions. DO NOT add calcium to a home-prepared diet if:

- You feed a raw diet that includes raw meaty bones (RMBs) — parts such as chicken and turkey necks where the bone is fully consumed. Bones are high in calcium and phosphorus; there's no need to add calcium to a diet that includes at least 25 to 30 percent RMBs.
- You use a supplement that is especially designed to complete and balance a homemade diet, such as those made by Balance IT and Just Food For Dogs.
- You use a dog food “base mix,” such as those made by The Honest Kitchen and Sojo's, that you combine with your own added protein source according to the product directions.

When using supplements or base mixes that promise to complete a homemade diet, make certain that the product includes a complete nutritional analysis showing appropriate amounts of calcium.

Don't accept the verbal assurances of the company's owners or representatives, or those of pet food store employees; if they can't or won't provide you with complete nutritional analyses of their products, we would not rely on those products for anything more than an occasional meal.

Following Calcium Guidelines

With very few exceptions (see "When You Don't Need to Add Calcium," above), you need to add calcium to your dog's homemade diet.

Calcium guidelines can be determined in several different ways, including the body weight of the dog, the dry matter percentage of the food, and the calories that the dog needs. Each has its own complications:

- Small dogs eat more and have higher nutritional needs for their weight than large dogs do, so you can't use linear guidelines such as "give x amount per 10 pounds of body weight." Any time you see linear feeding instructions, it's a red flag that whoever is giving the instructions does not understand nutrition.
- The amount of moisture (water) in food can vary from about 10 percent or less in dry foods (kibble, dehydrated, freeze-dried) to 80 per percent or more in wet foods (canned, fresh, frozen, raw, cooked). You must convert the "as fed" food weight to dry matter (DM) in order to give guidelines based on how much food is fed. Dry matter percentages won't change much when you convert from "as fed" for dry foods, but are usually three to five times as much as the "as fed" percentage for wet foods. Also, because we feed dogs less of high-fat, calorie-dense foods, adjustments need to be made for foods with more than 4,000 kcal/kg DM.
- [Calculating nutritional requirements](#) based on the number of calories your dog needs is the simplest method, but comes with some warnings as well. Caloric needs will vary based on your dog's activity level, metabolism, and more. The right amount to feed will also be affected by how many calories your dog gets from treats, chews, leftovers, and other sources. In particular, inactive dogs who eat less food for their weight than would be expected should get most of their calories from a balanced diet in order to avoid nutritional deficiencies.

The National Research Council (NRC) issued updated nutritional guidelines for dogs in 2006. They recommend feeding adult dogs at least 1 mg of calcium per Calorie (kcal), which is the same as 1 gram (1,000 mg) per 1,000 kcal (Mcal).

The nutritional guidelines published by the [Association of American Feed Control Officials \(AAFCO\)](#), which were finally modified in 2016 to reflect the latest NRC recommendations, increased this to 1.25 mg calcium/kcal (1.25 grams/Mcal).

On a dry matter basis, that's 4 to 5 grams of calcium per kilogram of food on a dry matter basis, or 0.4 to 0.5 percent DM.

One other factor affects how much calcium your dog needs: phosphorus. There should always be at least as much calcium as phosphorus in the diet, up to twice as much for healthy dogs (or three times as much for dogs with kidney disease).

Most homemade diets that I've looked at have between 0.5 and 1.25 mg phosphorus per kcal, so giving 1.25 mg calcium per kcal will provide most dogs with an appropriate amount of calcium and a proper calcium:phosphorus ratio.

You will need to know how many calories your dog is likely to need, based on his ideal weight – not his actual weight. See Table I on the next page for the approximate amounts of calcium to add to homemade diets for dogs of various sizes and various activity levels in order to provide 1.25 mg of calcium per kcal. While nutrient needs don't vary by activity level, dogs who eat more food need more calcium in order to balance out the amount of phosphorus in the diet.

At minimum, give the lowest amount of calcium shown for your dog's ideal weight, even if you find that you need to feed fewer calories than shown to keep your dog at a proper, lean weight. If you must feed a lot less to help your dog lose weight or prevent your dog from gaining unwanted weight, it's time to cut back on the number of calories your dog gets from other sources.

The amount of calcium you give does not need to be exact. It's fine to give a little less or a little more calcium than shown. Most commercial diets for adult dogs that I've looked at have between 2 and 3 mg of calcium per kcal (diets designed for puppies or for "all life stages" will have even more). These diets also have an equivalently higher amount of phosphorus.

If you feed a diet that is part commercial, part homemade, adjust the calcium amounts shown in Table I appropriately. For example, if you feed half homemade, give half the amount of calcium shown.

Calcium for Puppies is Trickier

All of these guidelines are for adult dogs only. Puppies are trickier. NRC and AAFCO agree that puppies need at least 3 mg of calcium per Calorie (three times the amount of calcium that adult dogs need on a caloric basis).

The maximum amount of calcium that puppies should get is 4.5 mg per kcal (4.5 g/Mcal). It's especially important not to give too much calcium to large-breed puppies during their first six months, as they are the group most likely to develop bone and joint abnormalities when given the wrong amount of calcium and phosphorus.

Puppies also need more phosphorus than adult dogs do. Never add plain calcium to a puppy's homemade diet. Puppies need bone meal or some other type of supplement that provides both calcium and phosphorus, in order to provide the correct amount and ratio of calcium to phosphorus.

What Form of Calcium Should You Give Your Dog?

There are many forms of calcium that can be added to your home-prepared diet to meet your dog's requirements. Any form of plain calcium, without other ingredients such as vitamin D, is fine. Dogs do need vitamin D, but since dogs need more calcium but not more vitamin D than people do, the amount of vitamin D that you would end up giving when using a combination product would be too high.

Calcium carbonate is usually the cheapest and the easiest to give, as it has more elemental calcium than most other calcium compounds, so you will need to add less powder to the food.

One easy way to provide calcium is to use **eggshells** that have been washed, dried, and ground to powder in a clean coffee grinder or blender. One large eggshell will make about one level teaspoon of eggshell powder weighing 5.5 grams; this will provide approximately 2,000 mg calcium:

1/8 teaspoon eggshell powder provides about 250 mg calcium

1/4 tsp = 500 mg

3/8 tsp = 750 mg

1/2 tsp = 1,000 mg

5/8 tsp = 1,250 mg

3/4 tsp = 1,500 mg

7/8 tsp = 1,750 mg

1 tsp = 2,000 mg

Some people like to give their dogs whole eggs with the shell, but I don't think that's a good way to ensure that your dog gets the right amount of calcium. The calcium in eggshells that have not been ground to powder may not be absorbed, particularly if you notice any bits of shell in your dog's stool. If it is absorbed, you may end up giving too much calcium, especially to smaller dogs.

It's okay to give a dog a whole egg, including the shell, as a treat on occasion, but when using eggshells to provide dietary calcium needed to balance out a homemade diet, it's safest to grind the shells to a powder.

If you use a calcium supplement that also includes phosphorus, such as **bone meal powder** or **dicalcium phosphate**, you will have to give more calcium than if you use a plain calcium supplement in order to keep the calcium:phosphorus ratio in the proper range. To determine how much to give, you must first subtract the amount of phosphorus from the amount of calcium, then use the remaining amount of "extra" calcium to calculate how much to give based on *Table I*.

*Table I: Calcium
Supplementation Goal: 1.25
mg Calcium per kcal Fed to
Adult Dogs*

For example, if the bone meal supplement you're using has 800 mg calcium and 300 mg phosphorus per teaspoon, there's 500 mg "extra" calcium to use to calculate how much to give. If your dog needs 1,000 mg calcium added to his diet based on Table I, you would need to give two teaspoons of bone meal powder (500 mg extra calcium per teaspoon) in order to provide an appropriate amount of calcium while ensuring that the calcium:phosphorus ratio remains in the proper range.

Note that bone meal products designed for humans may not tell you the actual amount of calcium and phosphorus they provide, but will instead give you percentages of daily recommended values for adults.

For example, NOW Foods Bone Meal Powder says that 1 level teaspoon provides 80 percent of the recommended daily amount (RDA) for calcium, and 30 percent of the RDA for phosphorus. The RDA for both calcium and phosphorus for humans has been 1,000 mg (1 gram), so 80 percent would be 800 mg and 30 percent would be 300 mg.

This calculation will soon become more complicated, however, as the FDA recently increased these recommended amounts to 1,300 mg calcium and 1,250 mg phosphorus. New labels must reflect this change by July 2020. If NOW Foods does not change their formulation, the same product would now show that it provides 62 percent RDA for calcium and 24 percent RDA for phosphorus.

Many bone meal products provide about twice as much calcium as phosphorus. In this case, you can just double the calcium recommendations shown in Table I to determine how much to give.

If you use bone meal powder to provide calcium, look for brands that have been tested to show that they contain low levels of lead. Never use bone meal products intended for fertilizer.

Dolomite is another type of calcium supplement that may contain unacceptably high levels of lead.

Plant-based calcium supplements show considerable variety in the amount of lead they may contain; contact the company to ask for test results before using one of these supplements on a daily basis.

Again, these guidelines are only for dogs who are fed a homemade diet that lacks an adequate source of calcium, such as [raw meaty bones](#) or a supplement designed to balance a homemade diet. There's a lot more to feeding a homemade diet that we'll try to address in future articles, but getting the calcium right is a big step in the right direction of feeding a [complete and balanced diet](#).

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Mary Straus

Mary Straus has been a regular contributor to Whole Dog Journal since 2006. Mary first became interested in dog training and behavior in the 1980s. In 1997, Mary attended a seminar on wolf behavior at [Wolf Park](#) in Indiana. There, she was introduced to [clicker training](#) for the first time, and began to consider the question of how we feed our dogs after watching the wolves eat whole deer carcasses. Mary maintains and operates her own site, [DogAware.com](#), which offers information and research on canine nutrition and health. DogAware.com has been created to help make people more "aware" of how to make the best decisions for their dogs. It's designed for people who like to ask questions and understand the reasoning behind decisions, rather than just being told what to do. Mary has spent years doing research for people whose dogs have health problems, or who just want to learn how to feed them a better diet. Over this time, she has learned a great deal about dog nutrition and health, including the role of diet, supplements and nutraceuticals. In 2007, she was asked by The Ivy Group to contribute to *The Healthy Dog Cookbook*.

She previously also wrote a column for *Dog World*.