

Feeding Large Breed Puppies

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I see a fat teenager. The owner sees a cute roly poly puppy. I'm thinking OCD, dysplasia, osteoarthritis and chronic pain. The owner can't see past the fun of having a pup. She's making a big feeding mistake, but she's only doing what the breeder told her to do – give the puppy a grainless adult diet, or else the breeder's warranty is null and void.

“Life stage nutrition” has been questioned when based only on a dog's numerical age. We all see obese, arthritic ten-year-old dogs that really do need lower fat diets with higher levels of antioxidants and glucosamine; but there are plenty more that look and act younger, and for which these diets are inappropriate. And many breeders have recommended feeding adult foods to puppies to avoid growth problems. To further confuse the issue, we have a plethora of paleolithic diets that incorporate the AAFCO statement that they are complete and balanced for “all life stages”. So how important is feeding a puppy food?

Rapid growth = room for mistakes

The average golden retriever grows from 14 oz to over 65 lbs within one year – a 70 fold increase in size. Human beings take 18 years to accomplish the same thing. At the same time their joints are growing and being exposed to under- or over-nutrition, puppies are susceptible to higher weight stresses, compounding the challenges to normal development.

The most important factors in preventing developmental orthopedic disease (DOD) are rate of growth (which is proportional to the caloric intake) and dietary calcium level.

A common misconception found in many internet articles is the claim that dietary protein should be controlled in large breed puppies to prevent skeletal abnormalities. This theory was disproved some years ago (Nap, 1991). Most commercial puppy foods contain more protein than is thought necessary, but studies have shown that protein contents of 23% to 31% (dry matter) do not have a deleterious effect on growth. The effects of high dietary protein contents in the range of those found in raw diets have not been investigated, to this author's knowledge.

An overweight body condition is an important risk factor for DOD, and feeding for maximum growth increases that risk. Commercial puppy and adult foods containing 10% to 25% fat (dry matter) are considered adequate for growth. Raw diets tend to range from 20% to 40% fat (dry matter) so it is particularly important to slow growth by maintaining a very lean body condition when these diets are fed. It has been shown that body fat is higher in puppies fed very high fat, low carbohydrate diets during growth.

Body condition score

The body condition score (BCS) is an estimation of the body fat content. I recommend the 9-point scale, which is better validated (and in use anyway if one allows “half scores” in the 5-point system). All pet owners should learn how to perform a body condition score for their animals. Training your veterinary support staff to teach clients, having charts and pictures as well as making your own videos can lower the overall obesity level in your patients. Since this is such an important issue, you may also want a bulletin board for photos of your patients’ progress.

In puppies, the BCS should be monitored weekly, since the calorie requirement constantly increases to six to 12 months of age (depending on the breed). Maintain a body condition score of 4/9 in large breed, rapidly growing puppies. Remind clients to ignore the feeding quantities listed on commercial bags and to follow recommended amounts for a fresh food diet.

Dietary considerations

Many pet owners are feeding paleolithic and raw diets – foods that are high in protein and low in starches. Since fat travels with meat, these diets are both high in calcium (which is formulated to balance the high phosphorus content in meats) and in calories. Puppies eating too much of a paleolithic diet can get fat and are likely to get a calcium overdose. Monitoring BCS and keeping it to 4/9 is critically important for giant breed puppies fed a fresh food diet.

Decades ago, we considered some adult diets appropriate for puppies. However, a calorie-calcium mismatch is probably common. Adult maintenance foods are often less calorically dense than puppy foods. Additionally, these diets may have calcium and phosphorus levels that are higher in relation to energy density than a large breed puppy diet. If a rapidly growing puppy has to eat more food to obtain enough calories for growth, a calcium overdose is possible.

On the other hand, paleolithic diets which frequently carry AAFCO statements that guarantee the diet to be complete and balanced for all life stages may or may not have controlled calcium levels in relation to the often high caloric density.

Most nutritionists recommend that large, fast growing puppies eat diets containing at least 30% protein and 9% fat (dry matter basis). The calcium content should be around 1.5% (or 3 grams/1,000 kcal). Diets may have nutrient contents that vary from this guideline and still be appropriate, but you can’t know for sure without in-depth analysis. A very popular raw diet for dogs, carrying the AAFCO statement “formulated to meet the nutritional levels established by the AAFCO Dog Food Nutrient Profiles for All Life Stages” supplies too much calcium for large breed puppies. The calcium content on an as fed basis is 0.56% and the phosphorus content is 0.38%, which conform to AAFCO recommendations for growth. By converting the calcium and phosphorus concentrations to dry matter levels, and correcting for energy density, the calcium content of this diet is 7.5 grams/1,000 kcal. So if a large breed puppy is getting the expected caloric intake, he is eating too much calcium. In another example, a major OTC adult maintenance dry diet contains 22% protein, 1.1% calcium and 0.8% phosphorus as fed. After converting to dry matter content and correcting for energy, the protein content is 24% or 69 grams/1,000 kcal, and the calcium is 3.5

grams/1,000 kcal. The calcium content is correct, and the protein content is adequate but a little marginal for growth. What about treats and supplements?

Remember that treats add calories to the overall diet. Be sure the treats are small, and do not contain added calcium. Owners should be encouraged to use fruits and vegetables, both for the health benefits as well as the fact that they are low in calories. Small pieces of lean meat can also be used, but remember that most dogs are getting plenty of meat from their meals, while fresh vegetables and fruits are not a significant part of the diets of most dogs. Owners should be educated that treats are defined not by their ingredients, but by whether their dogs want them or not, and certainly not by whether they come in a box or bag from the store!

Studies have shown rather definitively that high calcium levels are a risk factor for development of DOD in large breed puppies. Be sure to advise owners to avoid calcium-containing supplements and treats.

There are no studies so far that indicate whether it is effective or harmful to supplement with glucosamine to large breed puppies because of their risk of DOD. In general, I wait until I recognize a risk factor in a dog. Veterinary acupuncturists and physical therapists, veterinary chiropractors, or orthopedic surgeons tend to recognize early signs of joint disease and may institute glucosamine supplementation earlier than general practitioners might. Some holistic veterinarians recommend intermittent use of these supplements in order to monitor for signs of disease that may be masked while using them.

Switching from puppy to adult foods

When the dog is near the adult sized frame and his energy and protein needs lessen, it's time for a food that is lower in caloric density. This does not happen at an arbitrary age.

It is also important to remember that the metabolic rate, and therefore the caloric requirement, drops after spaying and neutering. Be prepared to reduce the amount of food being given right after surgery, sometimes pretty dramatically, to maintain that BCS of 4/9 or 5/9. I personally don't recommend early spay/neuter (at three to four months of age) but under these circumstances, a growth diet will be necessary until about six to nine months of age, when full skeletal height is usually reached.

A puppy diet (or one formulated for "all life stages") can be fed to adult dogs; however, it's harder to maintain that ideal BCS, since puppy diets are typically more energy dense. By feeding a lower calorie adult diet, a bit more volume can be more satisfying to the adult dog, though continuing to monitor the BCS on a regular basis is critical.

If an adult dog's metabolic rate and caloric requirement are much lower than expected, it is important to remember that cutting the calories in a formulated diet also cuts nutrients. Some obese-prone adult dogs end up requiring 50% to 60% of the expected caloric intake to approach a normal weight, and since manufacturers formulate their diets so that nutrients are provided in proportion to the calories, some of these dogs may actually experience nutrient deficiencies.

In these cases, the dog should either be fed a lower calorie maintenance or a weight management diet, or eat a homemade food with daily vitamin and mineral supplements calculated to supply the dog's requirement. An "all life stages diet" with the high energy content of a puppy diet simply won't do.

Think about that 95 lb golden retriever with a BCS of 7/9, eating two 8 oz patties of raw food daily, and who is still overweight. The daily intake is already low, and would have to be reduced for weight loss. That dog is likely malnourished.

How to recommend food brands

Choose a food designed for large breed puppies, whether a commercial food labeled as such or a homemade diet designed by a nutritionist for this purpose. The most reliable foods have been tested in AAFCO feeding trials, in contrast to those that have simply been designed on a computer. Coach clients to keep their puppies thin – and to show love not by giving more food, but by finding fun activities to keep them occupied!

Stages of skeletal growth

- Endochondral ossification: Growth, maturation and chondrocyte apoptosis followed by bony replacement of cartilage
- Periosteal growth: Lamellar new bone formation
- Remodeling: Removal of newly formed metaphyseal and endosteal bone to adapt bone shape

Hazewinkel, 2012

Dietary recommendations for large breed puppies

1. Make sure the diet is complete and balanced for “all life stages” according to AAFCO guidelines, or if homemade, has been analyzed by a veterinary nutritionist. 2. Diets that have been tested in feeding trials are preferred to those that have been formulated according to AAFCO guidelines only. 3. Never free feed. 4. Keep the puppy lean (4/9 or 5/9). 5. Look for these guidelines: a. A dry matter content of about 30% protein, 9% fat, 1.5% calcium and 0.8% to 1% phosphorus. The calcium: phosphorus ratio should be between 1:1 to 1.3:1. b. If the diet deviates from these guidelines, refer back to #1-4.

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