**Large and giant breed (or any breed prone to hip dysplasia) puppies should be fed a restricted diet to slow growth.** Overfeeding encourages them to grow too fast, resulting in most of the bone and joint problems common in large breeds, including dysplasia, osteochondrosis, etc. Limit the amount you feed to keep your pup lean and slow-growing, which will not affect his eventual adult size.

**Never give supplemental calcium of any kind when feeding a commercial diet.** Excess calcium is another factor that has been linked to hip dysplasia and other developmental problems in large-breed puppies. Large Breed Puppy Formulas are usually designed to be lower in calcium and fat (calories) than other puppy foods, which can help to prevent these problems. They are sometimes lower in protein as well, however, which is not desirable. Protein and carbohydrates contain exactly the same number of calories per gram, so reducing protein in favor of carbohydrates provides less needed nutrition without reducing calories. Look for formulas that are high in protein without being high in fat.

**You should always feed puppies foods that are approved  either for puppies or for all life stages.** If you feed a food that is approved for adult dogs only, there could be inadequate amounts of protein and fat, and improper levels of calcium and other nutrients.

**High protein diets are preferred, as puppies need protein to thrive and studies have shown that high protein does not lead to developmental problems**, but high fat diets may contribute too many calories, leading to rapid growth. See the following articles for more information:

**"Effects of limited food consumption on the incidence of hip dysplasia in growing dogs"**, by RD Kealy et al., in JAVMA, Vol. 201, No. 6, Sept. 15, 1992 (pp 857-863), "On the basis of our findings in the long-term study reported here, limited food intake has a beneficial effect on development of the hip joints in growing and adolescent dogs. **Labrador Retrievers fed 25% less food than those fed ad libitum had less hip joint laxity when they were 30 weeks old than their ad-libitum-fed counterparts.** Furthermore, by maintaining the dogs on the same feeding regimen until they were 2 years old, this beneficial effect was still present at that age, as demonstrated by the significantly lower frequency of hip dysplasia in the limit-fed dogs."

[**Are high calcium diets related to bone disease?**](http://www.peteducation.com/article.cfm?c=0&aid=1089) "While feeding a special formula large breed puppy food to your puppy is not bad, there are no concrete studies that show it is better than a balanced puppy food formulated for all puppies."

[**Overfeeding During Growth**](http://web.archive.org/web/20050625171142/www.speedyvet.com/speedyvet/library.asp?page=18) "Overfeeding during the phase of rapid growth after weaning is linked to a variety of multi-factorial skeletal diseases including osteochondrosis, hip dysplasia, hypertrophic dystrophy and wobbler syndrome. A high protein diet (30% on a dry matter basis) does not increase the frequency or severity of skeletal abnormalities in giant breed dogs. So the excess weight during the period of rapid growth, rather than the protein content of the diet, is probably the factor which alters skeletal development.

[**Relationship of Nutrition to Developmental Skeletal Disease in Young Dogs**](http://personal.palouse.net/valeska/Growth-calcium-energy.htm) "Excessive dietary energy may support a growth rate that is too fast for proper skeletal development and results in a higher frequency of skeletal abnormalities in large and giant-breed dogs Because fat has twice the caloric density of protein or carbohydrate, dietary fat is the primary contributor to excess energy intake. . . . Unlike other species, protein excess has not been demonstrated to negatively affect calcium metabolism or skeletal development in dogs. Protein deficiency, however, has more impact on the developing skeleton."

[**Dietary Mineral Levels Affect Bone Development in Great Dane Pups**](http://www.bestfriendsvet.com/pdffiles/BoneDevArticleWa.pdf) "Controlling skeletal growth is considered critical in decreasing the expression of developmental bone disease in large and giant breed puppies. For these puppies, intake of calories and calcium should be restricted to a level that supports an adequate, but not excessive growth rate. If large and giant breed puppies are given unrestricted access from weaning to a puppy food with usual mineral and energy content, high mineral intakes may quickly result in bone mineral changes that could contribute to persistent skeletal problems."

[**The optimal growth of large breed puppies**](http://208.173.184.68/Portugal/dx3.htm) "Excessive food intake (calories) during growth results in a higher risk of developing HD. . . . Research into the growth of Great Danes (Nap RC, The Netherlands,) has shown that the protein level of a diet has no significant influence on skeletal development. High protein intake does not result in increased risk for OCD or HD, and there is no effect on the development in the longitudinal growth of the bone."