



## Exercising a Young Dog

When it comes to puppies, it may be tempting to exercise them so to drain that boundless puppy energy, but it's important to consider the impact exercise may have on puppy growth plates. When can I take my puppy jogging with me? When can my puppy start competing in agility classes? When can my puppy follow me on a bike? These are all important questions that puppy owners often ask. While there's no question about the fact that puppies love romping and moving about, even up to the point of exhaustion, as with most things in life, too much of a good thing can have an impact, and in this case, the impact can have deleterious effects to the pup's developing skeletal system.

### What are Puppy Growth Plates?

Puppy bones are surrounded by layers of soft developing cartilage tissue that are found towards the end of most long bones. These areas of soft cartilage are known as growth plates or more technically, epiphyseal plates.

Scottish surgeon John Hunter studied growth plates in great detail in the late 1700s. His studies on growing chicken revealed that bones do not develop from the center outwards, but rather bones grow lengthwise as new bone is generated at the end of long bones, right where the growth plates are located.

John Hunter's studies granted him the nickname of "father of the growth plate" and his contributions have surely helped both humans and animals. As one may imagine, since growth plates are made of soft, developing cartilage, they are vulnerable and can be quite prone to injury.

### Puppy Growth Plate Damage

When it comes to the skeletal development of puppies, it's important that the puppies' bones go through even growth, basically, synchronized growth that occurs evenly and as close to the same rate as possible.

If an injury to a growth plate occurs, the growth of damaged cells may slow down and come to a halt meaning that there may no longer be growth on one

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side. When the growing of the affected side is delayed and stopped, the unaffected, healthy side may continue to grow and this unevenness may lead to potential deformity.

Most commonly, the forearm area is the affected. When the injured growth plate of the ulna stops growing, the radius bone will keep growing potentially leading to one bone that is slightly longer than the other and causing bowed legs, explains veterinarian Dr. Gary.

Puppies are particularly prone to injury during strenuous exercise because they lack coordination and don't have a lot of muscle strength. On top of from excessive strenuous exercise, injury to a puppy's growth plates may occur from a fracture as can happen from a fall or being hit by car. While these fractures may heal, the bone may grow unevenly which, as we have seen, can lead to a deformity of the bone. If you therefore suspect injury to your pup's growth plates or witness any abnormalities, see your vet at once.

Did you know? Some dog breeds have a mutation in their genes responsible for transforming cartilage to bone. This causes shortened legs, a condition known as achondroplasia as seen in basset hounds, dachshunds and corgis.

Too young for agility?

### Preventing Puppy Growth Plate Injuries

Puppies need proper exercise as they grow and develop, but moderation is key. It's therefore important to be careful especially with high impact activities such as repeated jumping as to catch a Frisbee, hurdling through obstacles or jogging, especially over hard surfaces such as asphalt or concrete. Turf offers a more forgiving surface and better traction compared to hard cement or asphalt. Sustained vigorous exercise, leg-twisting activities or very rough play should be avoided.

When can my puppy start competing in agility? Many puppy owners may find it surprising when trainers tell them that their puppies are too young to start competing in agility. However, puppy owners may start their puppies on some pre-agility basics such as getting familiar with agility obstacles and other skills/



foundation exercises that aren't high impact and therefore won't put strain on those delicate growth plates. Consult with your vet and agility trainer for when you can get started.

Did you know? In a study involving 203 agility dogs, it was found that the tibia, radius and ulna were significantly longer than the femur and humerus, respectively, in dogs that were spayed or neutered at or prior to 8 months of age as compared to intact dogs. (Source: M.C. Zink)

### When Do Puppy Growth Plates Close?

As puppies develop, their growth plates close as calcium and minerals harden the soft areas but exactly when do these puppy growth plates close? Since dogs develop at different rates based on size and breed, there is no one rule that fits all.

For example, growth plates in a Chihuahua will close much sooner than a larger breed such as a Great Dane. Generally, most skeletal growth occurs when puppies are between 3 and 6 months of age. Afterward, longitudinal growth decreases, and by 10-12 months or up to 18 months in the large/giant dog breeds, most growth plates have fused and closed. However, some suggest the process can take even up to 20 months.

How can a dog owner know for sure whether a dog's growth plates have closed or not? The best option is to talk to the vet before starting puppies on any rigorous exercise or sport training regimens.

For the best peace of mind, consider that with an x-ray it is possible to see whether the bones have fused or not. On an x-ray the vet will be able to tell whether the growth plate has morphed into a solid, integral part of the bone leaving its only trace of existence under the form of an epiphyseal line, as seen in the picture on the right.

"Most sports medicine veterinarians recommend to not begin training until growth plate closure which depends on the size of the breed and can be anywhere from 10 months to 18 months of age."~Dr. Wendy Baltzer

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## Effects of Hormones

Hormones are known for playing a role in a puppy's growth plates and skeletal development. As we have seen, growth plates tend to generally close when a dog is 12 to 20 months old depending on breed and size. This coincides with the end of puberty, therefore in intact dogs' growth plates close after exposure to hormones.

Male and female sex hormones are known to play key roles in closure of bone growth plates. Therefore, if a dog is altered (spayed or neutered) prior to puberty, there is a delay in the closing process, which causes affected dogs to develop a rather leggy appearance which makes them more likely to suffer from orthopedic problems such as hip dysplasia, CCL injury and possibly even bone cancer.

Delaying neutering in larger dog breeds may help reduce the incidence of these orthopedic conditions.

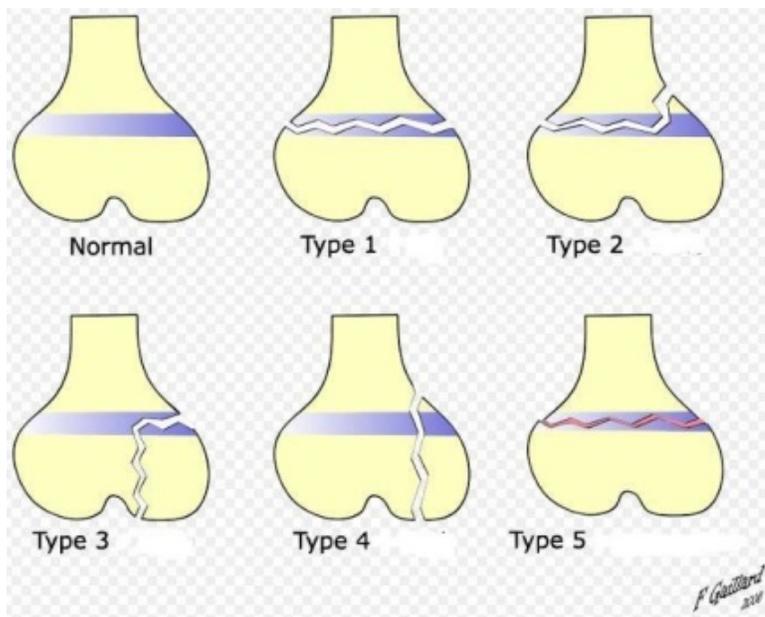
"The effects of neutering during the first year of a dog's life, especially in larger breeds, undoubtedly reflects the vulnerability of their joints to the delayed closure of long-bone growth plates, when neutering removes the gonadal, or sex, hormones." ~Benjamin Hart

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## Did you know?

A Salter-Harris fracture is a fracture involving the growth plates. This classification system categorizes dog growth plate fractures into several types as seen in the chart below.



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