WHAT KIND OF DWARF ARE WE?

by Charlie MacInnes, Finnshavn Cardigans, Canada

Achondroplasia is probably the commonest form of dwarfism in humans, and it's a nice 75¢ word, so we use it freely to describe the short legs of Corgis. That is WRONG. In fact Corgis are more correctly described as hypochondroplastic (P. F. Jezyk, Chapter 57 In: Textbook of small animal orthopedics, C. D. Newton and D. M. Nunamaker (eds), International Veterinary Information Service, Ithaca NY USA, www.ivis.org). The term chondrodystrophic has also been applied to dwarf dogs, but that also is a clear error. That form of dwarfism is related to malnutrition affecting growth. In these modern days of scientifically formulated dog foods, fed ad lib, Corgis remain dwarf, so clearly they are not chondrodystrophic.

Dwarfs come about when bones do not grow normally. The growth of long (leg, arm, hand, foot etc.) bones in the skeleton occurs at two rings, just along from the bone ends that form the joints. These regions are called growth plates. There is active cell division on both sides of the plate, to form cartilage. Later on, this cartilage changes to bone. Here are some definitions of parts of the big words. "chondro" signifies cartilage, "plasia" means growth or expansion or proliferation, so chondroplasia means the cartilage is proliferating. The root a- means none, but in fact that is impossible, in the sense that, if dwarfs had no growth of bone at all on the limbs, they would have the limbs of newborn puppies, and be unable to walk. The root hypo means less than normal, in contrast to hyper, which is more than normal. Thus, the distinction between achondroplastic and hypochondroplastic is subjective, and must involve criteria above and beyond the mere lengths of limb bones.

My best friend and fellow birdwatcher in grade school was an achondroplastic dwarf, so I was able to study the condition. In addition to the short, bowed legs and arms, there were other clear anomalies. His face was relatively flattened, and recessed under a high, domed forehead. His hands and feet were very short, with stubby fingers and toes.

Corgis have the shortened limbs, but their skulls and axial skeletons are those of normal dogs. The muzzle is not short or flattened, and the forehead is not domed. Even the feet are normal in size. Perhaps our preference for round or obovate feet represents selection for slight dwarfism, but given that the paws are large, I doubt it. When a Cardigan is high off the ground, it may be called long-legged. In fact, if you look carefully, it is more likely to be long in pastern than in upper arm. It was not until I met some Swedish vallhunds that I saw dogs with longer forearms and very short pasterns. Vallhunds are normally about 2 – 3 cm taller than Cardigans.

Dwarfism results from partial failure of the growth plates of bones. In hypochondroplastics, this affects mostly the long bones of the limbs. What is unknown at present is whether the growth plates are just slow to produce bone, or whether they may grow at irregular rates.

There is one medical problem with dwarfism in Cardigans. Puppies that develop extreme bowing of the forearm may limp for several months. Bowing of the forearm results from the radius growing more slowly than the ulna. If that process is too extreme, the elbow and/or wrist joints may become dysplastic. I have an X-ray of the elbow of a puppy I bred where the radius is so short that the part of the ulna with the joint face is well beyond the actual joint. No wonder that puppy was limping! He did recover by about 14 months of age, but I could not talk the owner into having another X-ray done. The canine orrthopedic specialist who discussed the X-ray with me was the person who alerted me to the idea that we don't know exactly how the slow growth of the long bones occurs. She agreed that they might stop and start, and, there is no guarantee that the two bones of the forearm do that in perfect synchrony.

There certainly is a correlation between bow of the forearm and turnout of the toes. Just as greater growth of the ulna than the radius can disrupt the elbow, it can cause changes at the other ends as well. The most obvious change is rotation of the foot so that the toes point outward. So strongly bowed forearms and turned out toes tend to go together. The genetics are not at all clear: I have a male with too much curve to his forearm and extreme turnout, but his litter brother has a too-straight front and no turnout. Neither parent had pronounced turnout. I have also had extreme fronts turn up unexpectedly, usually only one per litter. The lesson for Cardigan breeders is that we must emphasize moderation in bow of forearm and turnout of feet, both central to Cardigan type. The more extreme degrees are dysfunctional.

In humans, achondroplasia is thought to be controlled by a single recessive allele. Jezyk suggested that hypocondroplasia might be allelic to this. In humans, an individual is dwarf or not dwarf (at least in the case of achondroplasia), with no evidence of intermediate sizes. Indivduals of normal size who have dwarfs in their ancestry can produce dwarfs. I believe that the genetics of dwarfism in Corgis represent a more complex situation, probably as a result of prolonged selection for a package of functional dwarf characteristics. The major evidence is that crosses of Cardigans with other breeds are intermediate in terms of limb lengths. I do not know enough about breeding from such crosses to know whether there are distinct size categories – e.g. "dwarfs", "half-dwarfs", etc., or whether there is a continuum of sizes in later generations from these crosses.

Dachshunds are known to suffer from degenerative disc disease. Corgis do not appear to suffer from bad backs as frequently as dachshunds. One rule of thumb is that dogs of either breed are more likely to develop disc problems if they are walked only on leash, or in small back yards. My dogs are walked off leash, over uneven ground on a 10 ha property, twice a day. They run loose with enthusiasm, and in doing so develop and maintain excellent muscle tone. Human chiropractors will confirm that human couch potatoes are most likely to have back problems.

There are bits of Corgi lore that fall into the old wives tales category. One is that if you allow a Corgi puppy to exercise too much, it will grow longer legs. While it is plausible that a lot of activity might stimulate the faltering growth plates, there is no

evidence that this actually happens. My dogs live on 10 ha, and puppies are allowed hours of outdoor activity, yet I do not have longer legged dogs. Another old piece of Corgi conventional wisdom holds that you should carry a puppy up and down stairs until it is at least a year old, lest it damage its shoulders from the pounding coming downstairs. Again, because Corgi puppies, especially the well-fed (spoiled) are stout, this is plausible. However, I have allowed Corgi puppies to do stairs when they want to, for more than 30 years, without adverse effects. There are much more probable reasons for a puppy to become temporarily lame on its front.

Lloyd-Thomas claimed that the dwarfism of Cardigan Corgis originated from teckel (dachshund) stock. He further claims that the Pembroke Corgi dwarfism originated from somewhere else. I doubt the latter, but there is room to speculate on the relation to teckel stock. There is little doubt that the Corgis have been with the Celts a long time. The earliest signs of the Celts in archaeology are jewellery and other burial artefacts in the salt-mining country of Bavaria and adjacent Austria. Coincidentally, that is the region where the teckel stock has produced the greatest number of breeds. From Bavaria the Celts traded over much of Europe, and produced major settlements in eastern and central France. Eventually, Celts reached Galicia, in the northern part of the Iberian peninsula, and from there they spread north to Irelend, Scotland, Wales, Cornwall and Brittany. Caesar had major battles with a group of Celts in east-central France. Their leader, Vercingetorix, agreed to be executed, in return for the Romans sparing the rest of his people. If the Celts had dwarf dogs in Bavaria, they have left evidence of that in the beagles, bassets, and terriers of France as they passed through more than a millennium ago. Celtic traders were known in Denmark at the time that the Norse ruled there, so the dwarf stock might have reached Scandinavia by that route, and possibly even come south to the Welsh coast in a Norse ship. All of the modern dwarf-legged dogs of Europe share with the Corgis the fact that their heads and bodies show little evidence of dwarfism. On the down side of the teckel hypothesis, Jezyk reported that careful study of dachshunds by McCusick indicated that they were not as easily classed as hypochondroplastic as the Corgis, bassets, and many terrier breeds. However, modern DNA studies may help unravel this mystery.

There is still much to be learned about the dwarfism of Corgis.

24.10.2005