Welcome to the “Health and Welfare” segment of the Newsletter. It is hoped that DCA members will submit ideas for this section of the magazine as well as articles about experiences pertaining to the healthcare of their dogs that will be of interest to other readers.

Breeder Education
Part of Effort to Raise Awareness About Pes Varus

*From the Purina Pro Club Dachshund Update Newsletter*

Though some breeders believe that pes varus has occurred in Dachshunds for about 40 years, others are still learning about the potentially crippling orthopedic disorder known in layman’s terms as bowlegged syndrome.

Andra O’Connell of Kerhonkson, N.Y., first encountered pes varus in 2003 when a Standard Longhaired Dachshund puppy from a litter she bred developed the condition. O’Connell, who breeds under the Amtekel prefix, had bred Dachshunds for 30 years but was not familiar with the disorder. When the puppy was sold around 12 weeks of age, there was no indication of the condition.

The owner noticed signs of lameness and a bowlegged conformation when the puppy was 4.5 months old. The veterinarian diagnosed the puppy as having damaged growth plates.

“There was never any mention or discussion of pes varus or a genetic inheritance,” O’Connell says.

The puppy had corrective surgery, and today, at age 8, is healthy.

Pes varus cropped up again in 2010 in two of seven puppies that O’Connell bred. One of the puppies is mildly affected, and the other one is considered severely affected because it is completely crippled. “It has been upsetting to have this disorder show up in two litters,” says O’Connell.

Pes varus affects less than 1 percent of Dachshunds, yet the condition has the potential to detrimentally impact quality of life, says Dan Burke, D.V.M., a clinician at the Veterinary Centers of America in Phoenix and a Dachshund breeder for 40 years. “I have been seeing more and more cases of pes ves over the last 10 years,” he says. “The important thing to realize is that this is a genetic based problem.”

Experts suggest that the condition, medically known as *angular hock deformity*, has an autosomal recessive mode of inheritance, meaning affected dogs inherit a copy of the gene mutation from both the sire and dam. Carriers are not affected by the disease but can pass the mutant gene to 50 percent of their offspring. However, because studies have not been completed, there is not conclusive evidence of this form of inheritance.

Charlotte Borghardt, chairwoman of the Dachshund Club of America Health Committee, says pes varus has become more common in recent years. “We seem to have quite a few cases in our breed all of a sudden,” she says. “It’s important to get the word out to breeders and owners, so they will be aware of the condition and know what signs to look for.”

A BOWLEGGED APPEARANCE

Pes varus is a Latin term that combines pes (foot) and varus (inward) and describes a deformity in which the distal tibia is turned inward toward the body. The disorder occurs when the distal tibial (shinbone) growth plate closes prematurely, causing asymmetrical growth of the tibia that results in a bowlegged appearance and lameness.

E. Mayrhofer first reported pes varus, describing it as metaphyseal dysplasia of the tibia, in an article in the German veterinary journal *Kleintierpraxis* in 1977. Stuart G. Johnson, D.V.M., and his colleagues at Texas A&M University were the first to use the term pes varus, reporting favorable results from type II linear external fixation devices to treat the condition in five Dachshunds in an article in *Veterinary Surgery* in 1989.1

The disorder also occurs in horses and humans. In people, the musculature deformity is
of the affected leg. Viewed from behind, the body’s center of gravity shifting toward the side a dog puts weight on the affected leg, with the ground, the affected leg looks bowlegged.”

The distal portion of the affected tibia is not level to properly, the medial side does not. Because the growth plate continues to grow,” Burke says. “In dogs with pes varus, the medial side of the distal growth plate closes prematurely, thus stopping growth, whereas the lateral side of the distal growth plate continues to grow.” Burke says. “This causes an uneven growth of the tibia and a varus angulation of the distal tibia. While the lateral side of the growth plate functions properly, the medial side does not. Because the distal portion of the affected tibia is not level to the ground, the affected leg looks bowlegged.”

In the early stage, pes varus is noticeable when a dog puts weight on the affected leg, with the body’s center of gravity shifting toward the side of the affected leg. Viewed from behind, the heel is in the inward position. As the tibial deformity progresses, laxity of the knee joint and lateral dislocation of the patellar occur, causing a dog to walk with a limp or with the affected leg lifted.

Pes varus has been documented in all three coat varieties and in both Miniature and Standard Dachshunds. The disorder occurs globally, with cases reported in Dachshunds from Finland, the Czech Republic and Japan. The disease ranges from mild to severe and can be unilateral or bilateral, meaning it can occur in one or both hind legs. The bowing of the legs usually is the first sign. Besides lameness, the disease can cause an inability to run and play, with dogs often stopping to rest after a few steps. When both legs are affected, one leg typically is more severely affected. Puppies with mild pes varus may show no clinical signs.

“The younger the age in which the growth plate closes, the more severe the deformity,” says James Tomlinson, D.V.M., DACVS, professor of surgery at the University of Missouri College of Veterinary Medicine. “Dogs that are mildly affected generally have no longterm problems as long as they maintain a reasonable weight. Many moderately affected dogs adapt well with seemingly no pain or limitation in their ability to get around.”

Surgery to correct pes varus, called an open wedge osteotomy, generally produces good to excellent results, with most dogs making a full recovery within eight to 12 weeks. Without surgery, osteoarthritis is inevitable and dogs may have problems with corresponding joints such as joint incongruity and instability. Unfortunately, the procedure, which averages around $3,000 per leg but varies based on the geographical location, is cost prohibitive to some owners.

“The open wedge osteotomy involves cutting across the tibia bone, close to the curvature, while leaving a portion of the contralateral cortical bone intact,” Tomlinson explains. “This creates a hinge on the lateral side of the tibia. As the bone is straightened, a pie-shaped wedge or deficit is created. Bone graft tissue is then inserted into the osteotomy site. Stabilization is done with a veterinary Tplate, a type of bone plate, or a modified external fixator.”

Advantages of the bone plate include a low risk of postoperative infection. “Since the plate is embedded in the body, the affected limb can be used soon afterward and the hardware does not need to be removed,” says Tomlinson. “The greatest chance for successful transplantation of live bone is with a cancellous autograft, which means the tissue comes from a dog’s own body.” Cancellous bone, also known as trabecular of spongy bone, is harvested from the upper end of the humerus or the wing of the ilium. In

This radiograph shows the bowlegged deformity in a Dachshund with bilateral pes varus. Image provided by Dr. Dan Burke.
Pes Varus
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mode of inheritance, there is no genetic test available to identify carriers. “This makes it
difficult to offer solid recommendations to
breeders,” says Paula Henthorn, Ph.D.,
professor of medical genetics at the University of
Pennsylvania School of Veterinary Medicine.

“You want to remove the deleterious genes,
but not necessarily at the cost of removing all
affected dogs and their immediate relatives
(sires, dams, offspring and littermates) from
the gene pool,” Henthorn continues. “Doing so
could create a bottleneck effect in which you
inadvertently increase the risk for other diseases
or conditions that are more complicated or life
threatening.”

Henthorn advises breeders to consider all of a
dog’s attributes in choosing breeding partners.
“It also is important to keep accurate records,”
she says. “If the mode of inheritance is
autosomal recessive, a dog may be clinically
normal but a carrier for pes varus.”

Though no genetic research is planned to
identify the causative mutation for pes varus,
Borghardt is optimistic that a project could come
about in the not too distant future. T-Gen
Research in Arizona may consider the project.
Research support via funding and sample
collection will come through educational efforts,
she believes.

O’Connell, who will be submitting blood
samples from her affected and normal
Dachshunds when a research project starts,
agrees. The samples are stored at the DNA
Repository at the Canine Health Information
Center (CHIC), a canine health database
sponsored by the Orthopedic Foundation for
Animals and the AKC Canine Health Foundation.

“If other breeders of affected and normal dogs
would collect and store DNA, we would have a
larger DNA collection ready when the research
begins,” O’Connell says. “That’s my goal. I hope
that one day we’ll know much more about this
disease in Dachshunds.”

1. Iizumisawa Y, Seno T, Abe R, Miyoshi K, Maehara S, Wakahchi

MY EXPERIENCE
WITH PES VARUS
by Patricia Nance
http://www.fieldworthy.com/pes-varus.html

In 2010 I had a new and difficult experience. A
good young bitch that I bred and owned, the only
young bitch that I owned, developed Pes Varus.

Ironically, the rear conformation of this dog
was one of the things I liked most about her
when she was a young puppy. But in January,
when she was about five months old, I began to
notice something different with her hind legs,
especially the right hind. They began to look a
bit different. A hair crooked. I did not know
what I was seeing. I thought it was minor and
that she would grow out of it. So I waited for
months, but it only became much more evident
that there was some kind of a problem.

Having never seen anything like it in my dogs,
I researched and read what little I could find
about hock deformities. The first information
I found was about Pes Varus in foals. Then I read
about Pes Varus in human babies. I found
mention of it on a site for dandie dinmont
terriers. And finally, I found more than I really
wanted to know about Pes Varus in dachshunds.

Banking DNA for the Future
Dachshund breeders and owners are
encouraged to submit blood samples
from affected and normal dogs to
support future research to identify the
causative mutation for pes varus.
Samples should be sent to the Canine
Health Information Center (CHIC).
For information about sending DNA
samples, please visit:
www.caninehealthinfo.org.

The disorder varies between species. In
horses and humans, Pes Varus is commonly
called “club foot”, it affects newborns, it may
involve one or more legs, it is related to
musculature, and it is correctable by methods
other than surgery.

In dogs, it is also known as Angular Hock
Deformity, it develops as the tibial growth plates
start to close at about five months of age, it is
usually bilateral, it is bone related, and it is not
correctable except by surgery which may be
done in severe cases.

The degree of severity of Pes Varus varies. As
mentioned, severe cases may require surgical
correction. In my limited understanding, though,
many if not most dogs with the deformity do
very well. Meaning, they evidence no pain and
no real limitations in their ability to get around.
Arthritis in the affected joints may be an issue
as the dog gets older, and some lack of stamina
may also become evident as the dog ages. This
makes sense because if some parts of the
skeleton aren’t functioning properly, other parts
must compensate.

Pes Varus may likely is a genetic disorder. It is
presently thought to be an autosomal recessive
measuring that two copies of the
abnormal gene must be inherited for the trait to
develop, one from each parent.

Fortunately, my youngster did not develop
severe deformity. She ran and zoomed with more
energy, speed, and sheer joy than most puppies I
have had. I never saw her take a halting step or
act as though movement was uncomfortable. I
will add that the problem is greater in her right
leg than in the left, which seems to be true in
other cases I am aware of.

The Pes Varus diagnosis became ‘official’
when she was seen by a veterinary orthopedic
specialist in August, 2010. In November, my
pick of the litter, the bitch I’d waited for for
six years, went to her new home. She will not
be bred.

Since this experience, I’ve realized that I have
seen Pes Varus in dachshunds before but did not
know what it was. Nearly a lifetime in the breed
and I did not know what Pes Varus was!

Also since then, I have seen Pes Varus in
two other dachshunds, both longhairs. (Maybe
because longhairs are the only dachshunds I
look at?!). One was a standard black/tan male
of European bloodlines, and the other a
miniature red female of American breeding. In
addition, I received photos of Pes Varus in a
standard longhaired bitch [see photos above],
and have heard of it in a female standard wire
puppy in whose bloodlines, too, the disorder
was not known.

Does it only seem so because it is new to me,
or is Pes Varus becoming more common in our
breed?

Dachshund breeders, exhibitors, and judges
need to know about Pes Varus.

Above photos are courtesy of Tia Eskelinen
Kennel Cadium in Finland