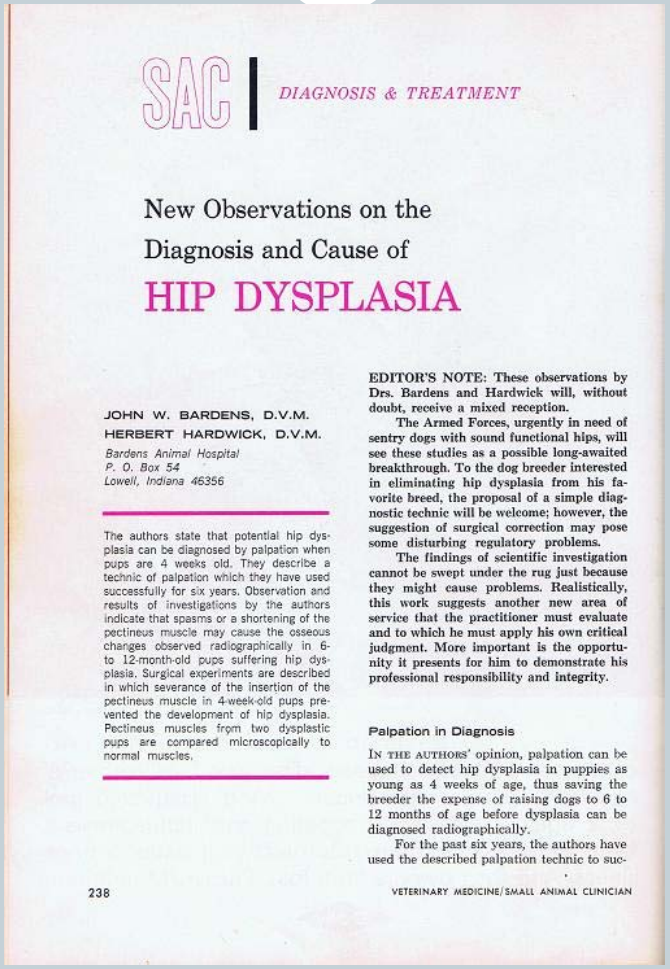
Diagnosis and Cause of CHD



SAC | *DIAGNOSIS & TREATMENT*

New Observations on the Diagnosis and Cause of HIP DYSPLASIA

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The authors state that potential hip dysplasia can be diagnosed by palpation when pups are 4 weeks old. They describe a technic of palpation which they have used successfully for six years. Observation and results of investigations by the authors indicate that spasms or a shortening of the pectineus muscle may cause the osseous changes observed radiographically in 6- to 12-month-old pups suffering hip dysplasia. Surgical experiments are described in which severance of the insertion of the pectineus muscle in 4-week-old pups prevented the development of hip dysplasia. Pectineus muscles from two dysplastic pups are compared microscopically to normal muscles.

EDITOR'S NOTE: These observations by Drs. Bardens and Hardwick will, without doubt, receive a mixed reception.

The Armed Forces, urgently in need of sentry dogs with sound functional hips, will see these studies as a possible long-awaited breakthrough. To the dog breeder interested in eliminating hip dysplasia from his favorite breed, the proposal of a simple diagnostic technic will be welcome; however, the suggestion of surgical correction may pose some disturbing regulatory problems.

The findings of scientific investigation cannot be swept under the rug just because they might cause problems. Realistically, this work suggests another new area of service that the practitioner must evaluate and to which he must apply his own critical judgment. More important is the opportunity it presents for him to demonstrate his professional responsibility and integrity.

Palpation in Diagnosis

IN THE AUTHORS' opinion, palpation can be used to detect hip dysplasia in puppies as young as 4 weeks of age, thus saving the breeder the expense of raising dogs to 6 to 12 months of age before dysplasia can be diagnosed radiographically.

For the past six years, the authors have used the described palpation technic to suc-

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FIGURE 1

The landmarks for palpation are the ilium, ischiatic tuberosity and the greater trochanter. In this photo, the thumb of the right hand rests on the ischiatic tuberosity and the index finger on the ilium. The left-hand thumb is on the greater trochanter.

FIGURE 2

To palpate, the knuckle of the right index finger is placed against the ischiatic tuberosity while the thumb of the same hand is placed lightly on the greater trochanter. The femur is approached caudally with the left hand, grasped in the middle third and lifted upward while the animal is held down with the index finger of the right hand on the ischiatic tuberosity. A normal hip should have no more than 1 mm. of upward displacement.

FIGURE 3

With the dog in dorsal recumbency, the legs are abducted. Hip dysplasia is indicated if the stifles will not touch the table.

FIGURE 4

Abduction of the legs, showing the pectineus muscle in contraction. Pectineus muscles lie between the areas outlined on each leg.

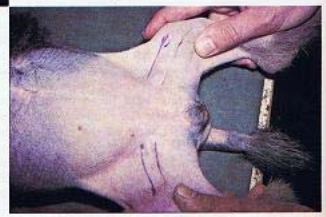

FIGURE 5

A dissection of the canine leg showing the contracted pectineus muscle.

FIGURE 6

The pectineus muscle has been severed to release the tension of the muscle.

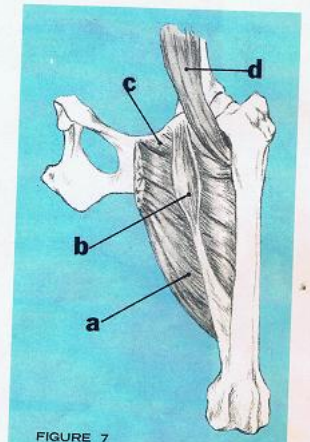

FIGURE 7

Relationship of the pectineus muscle to other structures of the canine hip: a) adductor magnus et brevis; b) pectineus muscle; c) adductor longus, d) iliopsoas. (After Miller, M.E.: *Anatomy of the Dog*, W.B. Saunders Co., Philadelphia, Pa., 1964; p. 248.)

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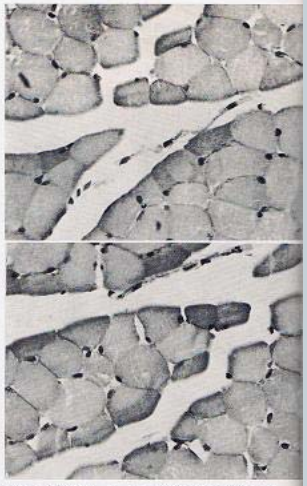
Surgical Experiments

THE FIRST experiments involved 8-week-old pups in which a potential Grade 3 or 4 bilateral dysplasia had been diagnosed by palpation. The insertion of the pectineus muscle was severed in one leg of each of these dogs; the opposite leg served as a control. Radiographs made when the pups were 6 months old showed the predicted Grade 3 or 4 dysplasia in the unoperated hip, whereas there was only a Grade 1 or 2 dysplasia in the operated hip. In 6 other 8-week-old pups, bilateral Grade 1 or 2 hip dysplasia had been diagnosed via palpation. Six months after severance of the pectineus muscle in one leg of each of these pups, 4 of the 6 had a normal hip on the operated side and a Grade 1 or 2 dysplasia on the opposite side. In one of the 2 remaining dogs, the pectineus muscle grew back; in the other dog, the pectineus muscle had not been completely severed.

Results of the foregoing experiments led to the conclusion that surgery could be performed on the pups at an earlier age than 8 weeks; however, it appeared that the surgery could not completely correct a Grade 3 or 4 dysplasia.

In succeeding experiments, surgery was performed on 14 pups at 4 weeks of age. Bilateral Grade 3 or 4 dysplasia had been predicted in 5 of these pups, and bilateral Grade 1 or 2 in another 5. As in previous experiments, one leg was operated on in each of these animals and the opposite leg served as a control. Bilateral surgery was performed on 4 other pups, 2 with potential Grade 1 or 2 dysplasia, and 2 with potential Grade 3 or 4 dysplasia. The owners of these dogs selected for bilateral surgery agreed to sterilization of the dogs and agreed not to show or sell them.

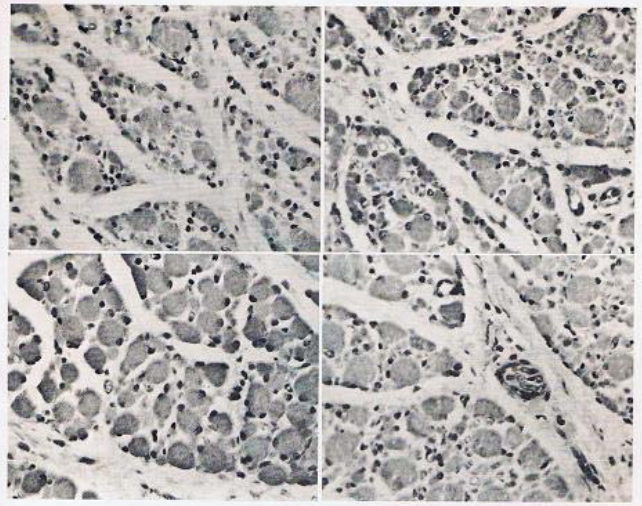


FIGURES 10 & 11—Photomicrographs of cut sections of a pectineus muscle from a normal puppy (original magnification 330X).

Palpation of the hips of the 10 pups on which unilateral surgery was performed has indicated that they are normal or near normal at 12 weeks of age. Radiographs will be made when these dogs are 6 months old. The 4 pups on which bilateral surgery was performed are almost 6 months old. All of them appear to be sound on palpation and there has been no observable adverse effect on gait or stamina.

Histopathology

PECTINEUS muscles, taken from two different pups (one pup with potential Grade 1 or 2 dysplasia and the other with Grade 3 or 4), were submitted for pathologic exam-



FIGURES 12 - 15—Photomicrographs of cut sections of pectineus muscles from two puppies with hip dysplasia (original magnification 330X).

ination by George H. Cardinet III, D.V.M., Ph.D., Kansas State University.

Dr. Cardinet's report stated: "The muscle of puppies palpated as potentially dysplastic were pale and hard compared to the normal muscle. When cut with a razor blade they appeared fibrous in nature compared to the normal. The outstanding characteristic of both specimens is muscle fiber atrophy. The degree of atrophy varies between fasciculi and different areas within the muscle, but this change is a consistent finding throughout. There is an apparent increase in sarcolemmic nucleoli. Muscle spindles are readily seen and appear normal. Diagnosis: Myopathy (atropy) due to spinal or renal disease."

Photomicrographs of normal muscles are shown in Figures 10 and 11; muscles from the two dysplastic puppies are shown in Figures 12 through 15.

Conclusions

THE AUTHORS' belief that palpation can be used for early diagnosis of hip dysplasia is justified by the number of cases palpated and radiographed during the past six years.

Limited studies suggest that the pectineus muscle may play an important role in the etiology of hip dysplasia. The studies further indicate the need for additional study of this muscle and all the adductors —especially those innervated by the obturator nerve.