

1979

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## Recommended Citation

Leyh, Randy and Carithers, Robert W. (1979) "Dermoid Sinus in a Rhodesian Ridgeback," *Iowa State University Veterinarian*: Vol. 41 : Iss. 1 , Article 8.

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# Dermoid Sinus in a Rhodesian Ridgeback

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## SUMMARY

An 11 month old Rhodesian Ridgeback had a noncommunicating, cervical dermoid sinus. Radiological examination was used to determine the extent of the sinus. The sinus was excised surgically.

## Introduction

The ridge of hair along the midline of the Rhodesian Ridgeback is unique to that breed. Also unique is the occasional presence of the dermoid sinus (pilonidal cyst). The sinus is hereditary in nature and is assumed to be controlled by an autosomal recessive gene.<sup>4,5</sup> Formation of the sinus occurs from an incomplete separation between the skin and the spinal cord, when the central nervous system develops.<sup>1,2,4</sup> The prevalence of this defect has declined over the years mainly due to selective breeding efforts. This report presents a clinical case of a dermoid sinus in a Rhodesian Ridgeback dog.

## Case Report

On October 6, 1978 a female, 11 month old, Rhodesian Ridgeback was presented to the Small Animal Hospital, Iowa State University. The dog had a history of a recurrent dermoid sinus, following previous attempts to excise it surgically. On examination, the dog appeared alert and in good physical condition. Two small inflamed areas were noted on the dorsal cervical midline. No hair was seen protruding from either of the two openings. A movable, cyst-like structure about 1-2 cm in diameter was palpated subcutaneously, deep to these openings. A thin tract lead from this cyst to

another similar structure attached in the area of the dorsal spinous processes of the cranial cervical vertebrae. (Figure 1.)

Before surgical excision was performed, radiographs were taken in an attempt to determine the extent of the sinus and if any connection to the meninges was present. Plain radiographs of the cervical spine showed no vertebral abnormalities. Subcutaneous, soft-tissue swellings were noted on the dorsal aspect of the neck. Fistulography was then accomplished by injecting Metrizamide<sup>a</sup> through a catheter into the larger of the two skin openings. Five ml of contrast medium was injected, at first. The tract was outlined randomly extending mid-ventrally to where it ended abruptly, just dorsal to the intervertebral disc between the second and third cervical vertebrae. Additional contrast was then added until resistance prevented further injection. On the radiographs (Figure

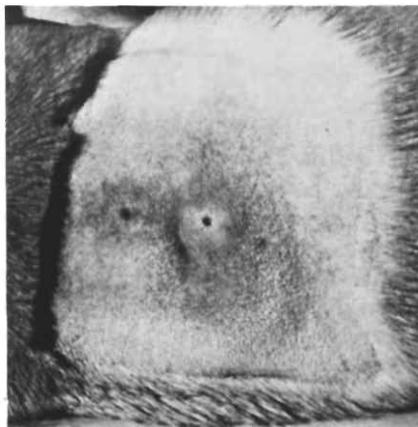


Fig. 1. Two small inflamed areas on the dorsal midline of a female Rhodesian Ridgeback.

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**Fig. 2. Lateral and VD contrast radiographs.**



2), a further enlargement of the sinus was seen, but still no connection with the spinal cord was noted. Two fine linear tracts of contrast were present proceeding caudally toward the area of the dorsal spine of the sixth cervical vertebra.

A myelogram of the cervical area was also performed to determine if any abnormality was present in the meninges. Metrizamide<sup>a</sup>

was injected at the cisterna magna. No indication of communication between the sinus and the dura mater was observed. The subarachnoid space did narrow at the cranial end of several vertebrae, which would suggest cervical vertebral malocclusion, malarticulation (Wobbler's) syndrome, or spondylolisthesis, but this was considered incidental.

The approach for surgical excision was at the dorsal midline from the second to the fifth cervical vertebra. An elliptical incision around the two sinus openings was followed by blunt dissection on the midline, down to the vertebral spines. The sinus and the surrounding tissue were separated from the cervical deep fascia down to the level of the lamina of the cervical vertebrae. Part of the supraspinous ligament was removed along with the sinus sac. An indwelling suction device<sup>b</sup> was inserted to help prevent seroma formation. Fascial planes and subcutaneous tissues were carefully apposed with an absorbable suture<sup>c</sup> and the skin was closed in a simple interrupted pattern. A light pressure bandage was applied around the neck to assist in maintaining tissue apposition.

Five days post surgery, a seroma developed and was drained. The swelling recurred and again it was drained. The dog's temperature increased so daily ampicillin (10 mg/lb tid) was continued. Edema then developed ventrally on the neck due to the light cervical bandage. The swelling pulled the skin edges apart and the area around the incision became moist and erythematous. No attempt was made to close the wound and it was allowed to heal by granulation. The site was cultured and *Staph. aureas* and *Enterobacter* were isolated. The animal was then switched to Gentocin (2 mg/lb bid).

After the sinus was removed, it was incised and found to contain a mass of hair in the lumen. Histopathology found connective tissue elements along with cells of chronic inflammation. Also present in the sinus wall were sebaceous glands, sweat glands, and hair follicles.

### Discussion

In man, the dermoid sinus has two separate etiologies: congenital and acquired. Little is known about pathogenesis of the congenital sinus. The acquired sinus is thought to arise from foreign bodies, mainly hair, protruding through the epidermis in an area of inflammation. Many of these sinuses have hair growing down into them instead of out of them. Barbers have been found to have dermoid sinuses between their fingers which actually contain someone else's hair!<sup>11</sup> In the Rhodesian Ridgeback, the dermoid sinus has a hereditary origin. It has been mentioned that because the sinus and the ridge of hair

are both unique to this breed, there may be a genetic connection between the two.<sup>2</sup> The exact mechanism of inheritance is not well established. Early opinion felt that the character was dominant and that a complex of genes was involved.<sup>5</sup> However, most evidence indicates the defect is controlled by a single, recessive, autosomal gene.<sup>7</sup> No cases of acquired dermoid sinuses, as in man, have been reported in the dog.

The formation of the dermoid sinus can be related to failure of complete separation of the neural groove from the epidermis during embryonic development.<sup>11</sup> Early in normal development of the spinal cord, ectoderm covering the notocord begins to thicken and form the neural plate. Laterally, this plate blends in with ectoderm of the blastodermic surface. Longitudinal folding of the plate forms a trough known as the neural groove. On each side of this groove are neural folds which continue to grow and then fuse together dorsally, enclosing the groove as a tube. Shortly after this fusion, the two ectodermally derived structures separate.<sup>9</sup> Incomplete fusion, somewhere in this normal process, forms the dermoid sinus.

The sinus occurs more frequently in the cervical area, and to a lesser extent in the sacrococcygeal region.<sup>6</sup> It is always on the dorsal midline. There are no reported cases of the sinus occurring along the ridge of hair. An animal may have one or multiple sinuses present at the same time.<sup>7</sup> Darkly pigmented hairs may be seen projecting through the sinus opening onto the skin.

The dermoid sinus has been classified into four morphological groups: in the first group, the sinus extends to the supraspinous ligament where it is attached; the second group does not go as deep, but is connected to the ligament by a fibrous band; a third type is similar to the second, but with no fibrous attachment; and finally, the fourth type is attached to the dura mater of the spinal cord.<sup>7</sup>

In the cervical area, the sinus generally is attached in the area of the spinous process of the second cervical vertebra. However, seldom does the sinus go any deeper and connect with the dura mater. The fourth type of sinus is mainly seen in the sacrococcygeal region, with the sinus extending from the skin in a cranioventral direction to the last sacral vertebra.<sup>6</sup>

Histologically, the dermoid sinus appears like an invagination of skin. The epithelium is thinner than normal, with the cornified layer consisting of one or two cell layers. Sweat and sebaceous glands are present in the sinus wall, as are hair follicles which are shallow and only partially functional. The contents of the sinus include inspissated sebum, hair, and exfoliated cells. The lesion will commonly be infected and contain evidence of inflammation.<sup>6</sup>

In the puppy, the sinus may be detected by raising the skin on the dorsal midline and palpating the subcutaneous tissues for a thin cord, approximately 1-5 mm in diameter. However, the sinus may be missed in the puppy. In older dogs, the sinus generally develops a thicker wall and it is easier to detect.<sup>1,7</sup>

Radiology is useful in diagnosing the extent of the dermoid sinus. Because the contrast medium used in the fistulography may demonstrate communication with the subarachnoid space, the dye must be compatible with meningeal and neural tissue. Myelography may be used to further confirm if an attachment is or is not present.

Radical excision with primary closure has been the treatment of choice for the dermoid sinus. In man, other techniques have been mentioned, including: excision with partial primary closure and open excision with no closure.<sup>11</sup> A method of cryosurgery accompanying excision also has been described.<sup>4</sup> These techniques have not been reported in veterinary literature.

With radical excision, dissection on the midline, as close to the sinus as possible, is important. Any excess tissue damage may create space in which fluids can accumulate. A mixture of methylene blue and hydrogen peroxide has been injected into the sinus preoperatively, and used to outline the extent of the sinus during surgery.<sup>4</sup> It is essential to remove the entire sinus and prevent any recurrence. A vertebral laminectomy may be necessary in communicating cases to allow enough exposure to ligate the sinus as close to the meninges as possible. When closing the incision, it is important to appose all fascial planes to eliminate any potential dead space.<sup>5</sup> Vertical mattress sutures with a stent rolled gauze, have been used to help ease tension on the skin edges.<sup>3</sup> A pressure bandage has been used also in preventing seroma formation.

- <sup>a</sup> Accurate Chemical and Scientific Corp., Hicksville, NY.  
<sup>b</sup> Hemovac, Snyder Laboratories, New Philadelphia, Ohio.  
<sup>c</sup> Dexon, American Cyanamide, Pearl River, NY.

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