

Carpal flexural deformity in puppies

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Summary

The aim of the study was to present carpal flexural deformity cases in dogs, which are seldom reported in literature, from the clinical and biochemical point of view.

Carpal flexural deformity was determined in a total of 31 puppies, of which 28 were brought to our clinic and 3 reported by a practicing veterinary surgeon. The puppy's ages ranged between 6-24 weeks, and they belonged to 10 different breeds. Following clinical and radiological examination of the puppies, blood samples were taken and calcium, phosphorus and magnesium values were recorded. Slight increases in these mineral values were determined in some of the patients. A splint with a caudal aluminum support, padded with a large amount of cotton, was applied to all puppies with deformity. This splint was kept on for 10 days and repeated in some cases. The study indicated that lesions can be prevented by applying a light splint in the early stages of deformity and that when dietary planning with balanced commercial foods is enforced deformity does not recur in later stages.

Keywords: carpus, flexural deformity, dog

Flexural deformity of the carpus is encountered more frequently in foals, calves, piglets and lambs, while rarely in dogs (2, 3, 6, 7). This disorder has been described as congenital (present at or soon after birth) in newborn foals and acquired (develops after birth during the growth period) in rapidly growing 10-18 month old foals (1, 4, 5, 7). Congenital flexural deformities most commonly affect the metacarpophalangeal joint or carpus in foals. Acquired flexural deformities affect the distal interphalangeal joint and metacarpophalangeal joint most frequently, with the metatarsophalangeal and proximal interphalangeal joint less frequently affected (5). Congenital deformities are multifactorial (teratogenic agents, intra-uterine mal-positioning, diseases of the mother during pregnancy etc). Acquired deformities can occur due to trauma, infectious polyarthritis and nutrition. The pathogenesis of flexural deformities remains unknown (1, 2, 4-6).

Carpal flexural deformity can occur as a unilateral or bilateral. The condition is associated with excessive tension in the tendons of the flexor carpi ulnaris muscle. Clinically, the postural defect mostly involves one or both forelimbs and takes the form of hyperflexion of the carpus. There is knuckling of the carpus as the puppy stands and walks. In severe cases, carpal hyperflexion and outward bowing of the carpus occurs and the puppy tends to stumble when walking (3, 5, 6).

The limb with flexural deformity could be straightened by manually extending the metacarpophalangeal joint, but returned to the flexed position when manual pressure was relaxed. When the flexural deformity is

not treatment, skin wounds could develop over the dorsal aspect of the metacarpophalangeal joint (2, 5).

Radiography is not required for the diagnosis of carpal flexural deformity. Diagnosis can be made on the basis of clinical signs. Although, radiography is useful to determine other abnormalities which may alter the prognosis for correction of the deformity (5).

Splint, casting and intravenous oxytetracycline administration is used for the conservative treatment of flexural deformities of the metacarpophalangeal joint in horses. Cast in young animals, rapidly growing animals may interfere with normal limb development and cause pressure sores if applied for too long. Half-casts or splints are more useful if the limb needs to be supported for longer periods. Although they provide less support, they can be easily removed and remodelled to accommodate limb growth. Nonsteroidal anti-inflammatory drugs (NSAIDs) have a role in the treatment of flexural deformities but they should be used carefully in young patients due to the potential side effects of gastroduodenal ulceration and nephrotoxicity. Intravenous oxytetracycline acts by chelation of calcium and inhibition of muscle contraction. Diet planning and corrective shoeing is used in acquired disorders. Improvement should occur within 2-3 weeks with full recovery by 4 weeks after onset. In cases unresponsive to treatment, inferior and proximal check desmotomy, flexor tenotomies and transection of the suspensory ligament are applied (1-5).

The aim of this study to present carpal flexural deformity cases in dogs, which are rarely brought to our

clinic and seldomly reported in literature, from the clinical and biochemical point of view.

Material and methods

The material of this study comprised a total of 31 puppies with carpal flexural deformity, of which 28 were brought to the surgery clinic with complaints of deformed legs and gait abnormality and 3 reported by practicing veterinary surgeons, in the 4-year period between 1999-2004.

Following clinical examination of the puppies brought to the clinic; antero-posterior and medio-lateral radiographs were taken of the areas distal to the elbow joint in the affected limbs. A detailed history was obtained from the patient owners. Age of the patient, feeding method, relationship with littermates and parents, duration of the disorder, medication used and vaccination status was established in the history.

Blood samples were collected from the puppies brought to the clinic and Ca, P and Mg values in blood were investigated. Following diagnosis at the time of presentation to the clinic, a splint with a caudally placed aluminium support and large amount of cotton padding was applied to all cases in which the lesion was identified. Patients were called back approximately 10 days later and status of the extremities and standing position was evaluated. The splint was continued in cases where considered necessary. Afterwards, patients were called back at regular intervals and the lesions were followed up. Following diagnosis, appropriate balanced commercial foods were planned for dogs fed the wrong food.

Results and discussion

The breeds of the dogs evaluated in this study were listed as; Anatolian Sheepdog (8), mixed breed (6), Rottweiler (5), English Setter (4), German Shepherd (3), Irish Setter (1), Italian Pointer (1), Doberman Pinscher (1), Staffordshire Terrier (1), Pitbull Terrier (1). Ages of the puppies ranged between 6-24 weeks. The deformity was seen to occur most frequently in the 6-8 week period.

The puppies were brought to our clinic between the 2nd-30th days of the start of the deformity. Carpal flexural deformity had formed unilaterally in 4 (fig. 1) and bilaterally in 27 puppies (fig. 2 and 3).

None of the puppies we examined had any other disease. They had not encountered any previous trauma. It was pointed out that the 3 cases reported by a practicing veterinary surgeon had suffered from parvoviral infection and that this deformity had occurred towards the end of the treatment.

All affected puppies had been separated from their mothers a short while (10-15 days) before and had been generally feeding on cow's milk and various dog foods. In 3 Anatolian Sheepdog littermates aged 8-weeks, the deformity was seen to occur in the 10 days following separation from the mother, while in the remaining littermates continuing to suckle the mother the deformity was not seen to occur. In the radiographs of cases with carpal flexural deformity, no macroscopic change was observed with relation to growth plates, bone and cartilage.

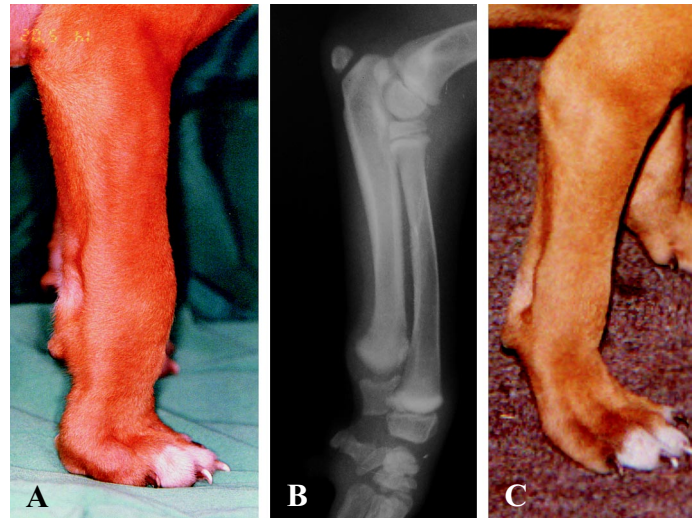


Fig. 1. A 10 week-old Staffordshire Bull Terrier; A) Unilateral carpal flexural deformity and bowing, B) Radiographic appearance same leg, C) Appearance of recovered legs after 10 days splinting



Fig. 2. A 6-week-old Pitbull Terrier with bilateral carpal flexion and bowing, worse in the left foreleg. This dog recovered after 10 days splinting

The deformation in the carpal joints of the patients brought to the clinic in the early stages (3-7 days) was easily corrected manually and these cases recovered completely with 10-day bandages. In cases brought in at a later stage, there was an obvious contracture in the flexor tendons, particularly in *musculus flexor carpi ulnaris*.

Following examination of all cases diagnosed with deformity and those reported by a practicing veterinary surgeon, a splint with a caudally placed light aluminium support and large amount of cotton padding was applied to the leg reaching up to the elbow joint, in order to make it easier for the puppy to walk, correct the deformation and prevent flexor tendon contracture. The splint was continued for 10 days and repeated in cases where necessary. Following removal of the splint, the carpal flexural deformity was seen to have been corrected in a case with bilateral deformity; however, that a medium degree carpal hyperextension had also developed (fig. 3). In 1 case with unilateral deformity, a splint was applied to the leg with the deformity. However,



Fig. 3. A 12-week-old Irish Setter; A-B) Appearance of bilateral carpal flexion, C-D) This dog had splinted for 10 days and mild hyperextension occurred after splint removal

3 days later hyperextension was seen to develop in the other leg. On the 3rd day, bilateral splint application was carried out in this case and also in the remaining 3 cases with unilateral deformity.

Blood samples were collected from the puppies and calcium, phosphorus and magnesium values were investigated. Slight increases above normal were determined in calcium and phosphorus in 7 puppies, calcium in 3 puppies, and phosphorus in 5 puppies and magnesium in 6 puppies. No change was observed in the remaining cases.

Flexural deformity of the carpus is encountered rarely in dogs (3, 6, 7). Vaughan (6) has suggested that, Doberman Pinschers may be predisposed to carpal flexural deformity and this lesion may be hereditary. Due to the cases in this study belonging to different breeds and lack of a dominant breed, we do not agree with this idea of the author. The high number of Anatolian Sheepdogs in this study may be attributed to regional or coincidental reasons. We think that, not only Doberman Pinschers but other breeds may also be inclined towards this lesion. For a certain verdict, longer period studies need to be carried out where higher numbers of cases are examined. Auer (1) and Wagner et al. (7), express that deformities developing in foals may be related to excessive and unbalanced carbohydrate

and protein intake and copper and zinc deficiency. Unbalanced and excessive feeding of the offspring may play a role in the development of the deformity. Analysis of these trace elements expressed by researchers could not be done due to financial difficulties. However, it was concluded that planning of the diet given to puppies was effective in the correction of the deformity and the disorder not recurring. While Vaughan (6) reported that conservative treatment was effective in most of the puppies, we do not agree with this idea, due to the high tension of the flexor tendons in the cases brought to the clinic at a later stage and also because the disorder did not recur in those to which a bandage was applied. Recovery was seen to continue for longer in delayed cases.

The facts that; carpal flexural deformity is seen in particularly 6-10 week old puppies, that these puppies are separated from their mother a short while before and that similar to our findings, in puppies belonging to the same litter, the deformity was seen in 3 Anatolian Sheepdog puppies separated from their mother a short while earlier but that it was not seen in the remaining littermates continuing to suckle their mother, shows the relationship between this lesion and feeding. Appearance of the lesion in the later stages of parvoviral infection in 3 puppies reported by a practicing veterinary surgeon supports the idea that it may be related to nutritional deficiency.

In cases with unilateral carpal flexural deformity, as it has been observed that carpal hyperextension may develop in the other leg, we think that a splint must also be applied to the sound leg.

In our opinion, the ethiological reason for the 31 cases of carpal flexural deformity evaluated in this study is unlikely to be related to hereditary reasons or to breed predisposition. The main reason being feeding is a stronger possibility. Thus, we think that studies on nutritional deficiency need to be carried out. It has been determined that the lesion can be prevented with a light splint application in early stages and at the dietary planning with balanced commercial food and deformity does not recur in later stages.

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