



## CASE REPORT

### The Importance of Physical Examinations of Lateral Short Collateral Ligament Ruptures of the Tarsal Joint in the Cocker Spaniel

JM Kim, H Kim, SW Jang, SH Choi<sup>1</sup> and IS Jeong\*

Department of Veterinary Surgery, Royal Animal Medical Center, Seoul, 131-878, Republic of Korea; <sup>1</sup>Veterinary Medical Center, Chungbuk National University, Cheongju, 361-763, Republic of Korea

\*Corresponding author: jung4545@korea.com

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#### ABSTRACT

A five-year-old female cocker spaniel was presented with left hind limb intermittent lameness after sliding one week earlier. There was no deviation of the right tarsal joint during extension and flexion of it upon a physical examination. However, there was mild pain and deviation medially on the left tarsal joint when the left tarsal joint flexed. Mild swelling of the left tarsal joint was detected upon a radiographic examination. Diagnosis was rupture of the lateral short collateral ligament (calcaneofibular ligament) of the left tarsal joint according to a physical examination. Surgical treatment was undertaken to reconstruct the lateral short collateral ligament using screws, washers and heavy suture material. The dog resumed a normal gait at nine weeks after surgery.

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#### INTRODUCTION

The tarsal joints are supported by a complicated arrangement of ligaments. The medial and lateral collateral ligaments of the tarsal joint consist of long and short components. The medial collateral ligaments consisting of the tarsocrural joint are the long medial collateral ligament, the short medial collateral ligament, and the calcaneocentral ligament. The lateral collateral ligaments consist of the long lateral collateral ligament and the short calcaneofibular ligament.

Rupture of the lateral short collateral ligament of the canine tarsal joint is diagnosed by a physical examination because only swelling of the joint is shown and not an avulsion fracture upon a radiographic examination. Although a rupture of both the short and long collateral ligament is common, only six cases of short collateral ligament rupture have been presented (Carmichael and Marshall, 2012).

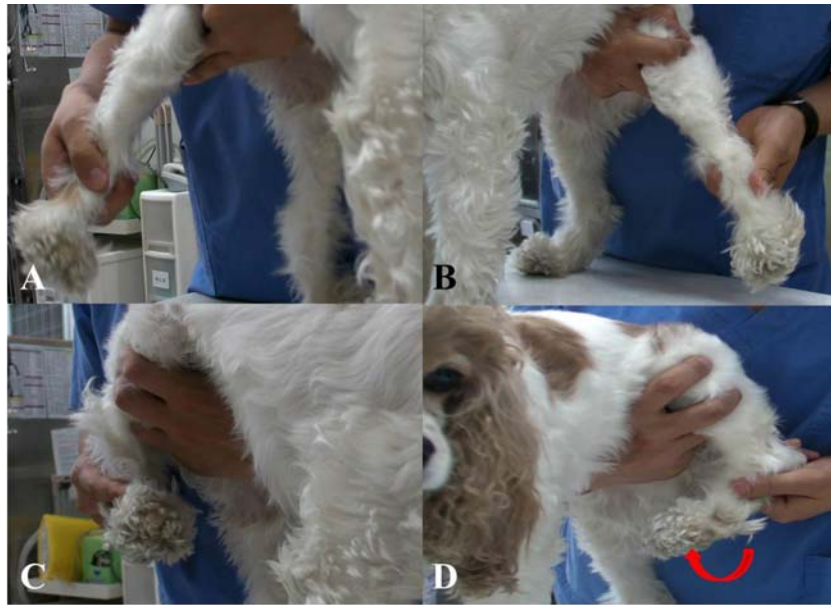
For the diagnosis of a rupture of the collateral ligament by a physical examination, deviation of the paw is tested while the joint is extended or flexed (Barnes *et al.*, 2013). In the case of a rupture of the long component of the tarsal joint, the paw is deviated medially or laterally upon extension of the joint (Scrimgeour *et al.*, 2012). Conversely, when the short component of the tarsal joint

is ruptured, the paw is deviated medially or laterally upon flexion of the joint.

Surgical treatment of tarsal joint instability can be performed by reconstruction with screws, washers and suture material or by tarsal joint arthrodesis. Adequate limb function can be expected in most patients with tarsal injuries after appropriate surgical intervention.

This case report discussed why a detailed physical examination is important only in the event of a lateral short collateral ligament rupture when the lateral long collateral ligament is intact.

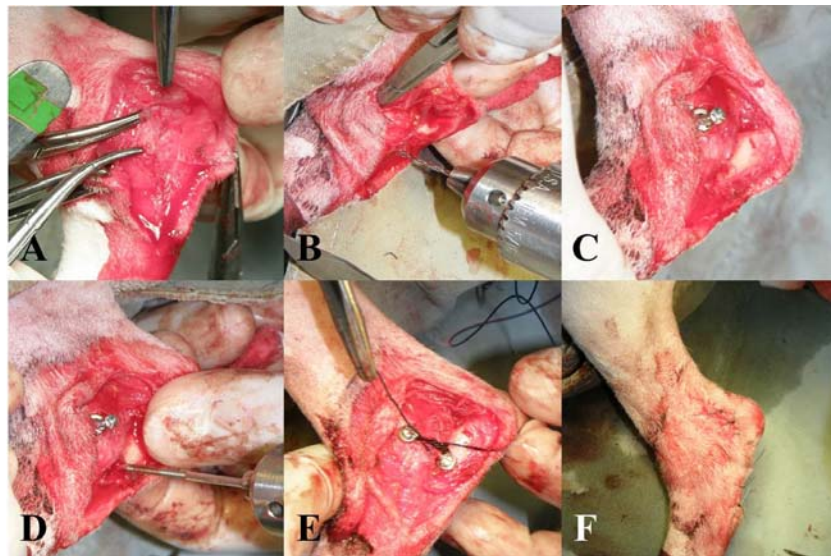
**Case description:** A five-year-old female cocker spaniel (body weight 10 kg) was presented with left hind limb intermittent lameness after sliding one week earlier. There was no deviation of the right tarsal joint during extension and flexion of it during a physical examination. However, there was a mild pain and deviation medially on the left tarsal joint when the left tarsal joint flexed (Fig. 1). Mild swelling of the left tarsal joint was detected upon a radiographic examination (Fig. 2). Diagnosis was rupture of the lateral short collateral ligament (calcaneofibular ligament) of the left tarsal joint according to a physical examination. Surgery was performed to reconstruct the lateral short collateral ligament using screws, washers and heavy suture material (Fig. 3). Rupture of the lateral short collateral ligament was confirmed after a lateral approach.



**Fig. 1:** Physical examination: A & B: The varus and valgus forces are applied to the right and left tarsal joint to evaluate the long component of medial and lateral collateral ligament while the joint is extended. C & D: The varus and valgus forces are applied to the right and left tarsal joint to evaluate the short component of the medial and lateral collateral ligament while the joint is flexed. D: The left paw is deviated medially (curved arrow) due to a rupture of the lateral collateral ligament compared to image C.



**Fig. 2:** Radiographic images: A: AP view. B & C: lateral view. Arrow: mild swelling of the joint compared to right one.



**Fig. 3:** Intra-operative images: A: Approach of the joint lateral tarsal joint. B: Drilling using a 1.5 mm drill bit in the joint distal fibula and tibia. C: Placement of a 2.0 mm screw and washer. D: Drilling using a 1.5 mm drill bit in the joint calcaneus. E: Reconstruction of the lateral collateral restraint complex with #2 blue nylon, screw and washer. F: skin suture is finished.



**Fig. 4:** Follow up of radiographic examination: A & B: radiographic images after surgery, C & D: radiographic images 6 weeks after surgery.

A two-millimeter screw and a washer were inserted onto the distal fibula and calcaneus behind the talus. The size 2 nylon was placed in a figure-eight fashion between two screws, and the suture was tied with the joint at 90 degrees. There was no laxity during the normal range of motion of the left tarsal joint after tying. Routine closure was conducted. After the repair of the tarsal joint subluxation, the tarsus was placed in a normal standing angle and was immobilized with rigid external coaptation for six weeks. During this time, activity was limited to leash walking, and the coaptation bandage was checked every week. There was no remarkable finding upon a radiographic examination six weeks after the surgery (Fig. 4). After removing the external coaptation, the tarsal joint was not flexed from a standing angle. Passive range of motion of the left tarsal joint was performed two times a day for minutes for three weeks by the owner of the patient. The dog resumed a normal gait nine weeks after the surgery.

## DISCUSSION

Rupture of the short collateral ligaments will cause rotational instability of the tarsal joint. This delicate instability is difficult to detect upon a routine physical examination if the long collateral ligament is intact. There is no gross lateral tilt instability. The tibia was grasped with one hand while the foot was rotated medially or laterally with the other hand in both a flexed and an extended position. The range of rotation was compared between the two hind limbs.

Rupture of the short collateral ligament is uncommon in a dog. A short collateral ligament rupture of the tarsal joint with an avulsion fracture has been reported in five large-breed types of dogs, and both medial and lateral short collateral ligament ruptures of the tarsal have been reported in the cocker spaniel (Sjostrom and Hakanson, 1994).

Both long and short ligament ruptures are commonly caused by shearing wounds as a result of a traffic accident (Benson and Boudrieau, 2002). However, in the present case it was considered that the lateral short collateral ligament was traumatically ruptured as the tarsal joint was flexed during fast sliding. The sliding forces acting on the short collateral ligaments can increase if the dog is running at a certain speed while turning. Both high

velocity and weight-bearing actions on the left leg while sliding may be high-risk activities that may lead to a rupture of the ligament (Chow and Balfour, 2012).

Screws, washers and heavy suture materials were used for the reconstruction of the lateral short collateral ligament of the tarsal joint in this case. There was no screw loosening or inflammation after surgery. The left tarsal joint was not flexed after the removal of external coaptation six weeks after surgery. Rehabilitation by passive range of motion of the left tarsal joint for three weeks was suitable for the resumption of normal limb function.

In conclusion, rupture of the short collateral ligament of the tarsal joint is an uncommon case. In this case, a lateral calcaneofibular ligament rupture was confirmed by a careful physical examination involving medial deviation of the paw while the foot was rotated bilaterally during the flexion of the joint. A detailed physical examination is important in the case of a lateral short collateral ligament rupture.

**Contribution of authors:** Acquisition of data related to surgery and follow up was carried out by JM Kim, H Kim, SW Jang and IS Jeong. JM Kim, SH Choi, and IS Jeong drafted the manuscript.

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