



CASE REPORT

Avulsion of the lateral head of the gastrocnemius muscle in a cat

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A 7-year-old male, castrated, domestic shorthair cat was presented with a plantigrade stance of the left pelvic limb. An avulsion of the lateral head of the gastrocnemius muscle was diagnosed based on clinical examination and radiographic assessment. Surgical reduction and fixation were achieved with modified locking loop sutures through bone tunnels in the supracondylar tuberosity of the distal femur. Additionally, a temporary calcaneotibial positional screw was placed in order to neutralise forces on the gastrocnemius muscle. No postoperative complications were encountered and the cat made a full recovery.

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A 7-year-old male-castrated obese (6.7 kg) domestic shorthair cat was presented with reluctance to move and a plantigrade stance of the left pelvic limb. The cat had been presented to the referring veterinarian 2 weeks previously, which had instituted a conservative therapy regime with strict rest and meloxicam (0.01 mg/kg PO q 24 h, Metacam Oral Suspension; Boehringer Ingelheim). The owners reported that the cat was uncooperative and difficult to handle. As the clinical status did not improve, they were referred to our clinic. The cat exhibited reluctance to move with a moderate lameness and a plantigrade stance of the left pelvic limb. Palpation of the common calcaneal tendon was unremarkable, whereas deep palpation of the left lateral fabella was slightly painful. No other clinically significant findings were observed on orthopaedic as well as neurological examination. The cat was anaesthetised with ketamine (8 mg/kg IV, Ketavet; Pfizer) and xylazine (1.5 mg/kg IV, Xylazin 2%; CEVA Tiergesundheit). After intubation, mediolateral and cranio-caudal radiographic views were taken of the left stifle, with the hock in flexion. These revealed a distal displacement of the lateral fabella (Fig 1a and b). A presumptive diagnosis of an avulsion of the left lateral head of the gastrocnemius muscle was made based on clinical and radiological findings. For the duration of the radiographs as well as the surgical preparation, the cat received supplementary oxygen through the tracheal tube and heart rate and haemoglobin

saturation (SpO₂) were monitored with pulse oximetry (NPB-40, Nellcor Puritan Bennett). Following the radiographs, the cat was routinely prepared for surgery. Buprenorphine (0.01 mg/kg IV, Buprenovet; Bayer), meloxicam (0.01 mg/kg SC q 24 h) and potentiated amoxicillin (20 mg/kg IV, Augmentin; Glaxo SmithKline) were administered preoperatively. General anaesthesia was maintained with isoflurane and the cat received a continuous rate infusion of lactated Ringer's solution (10 ml/kg/h IV, Ringer-Laktat; DeltaSelect).

During surgery electrocardiography, respiratory rate, SpO₂, end-tidal carbon dioxide, rectal temperature and oscillometric non-invasive blood-pressure (NIBP) measurements were continuously monitored (multi-parameter monitor, PM-9000Vet, Mindray). The animal was positioned in dorsal recumbency and a lateral parapatellar approach to the left stifle was performed. The displaced lateral head of the gastrocnemius muscle was retrieved and existing soft-tissue adhesions were broken down with blunt dissection. Two bone tunnels (1.1 mm) were drilled in the lateral supracondylar tuberosity of the distal femur, and the lateral head of the gastrocnemius muscle together with the fabella were reapposed with two polyamide (0 USP Trulon, Sutures India) modified locking loop suture patterns. The reconstruction was further stabilised with polydioxanone (3-0 USP Surgicryl Monofilament, SMI) simple interrupted sutures placed in the soft tissues of the caudal joint capsule. The individual muscle bellies as well as the subcutaneous tissues were reapposed in a routine fashion, using polydioxanone absorbable suture material (4-0 USP Surgicryl

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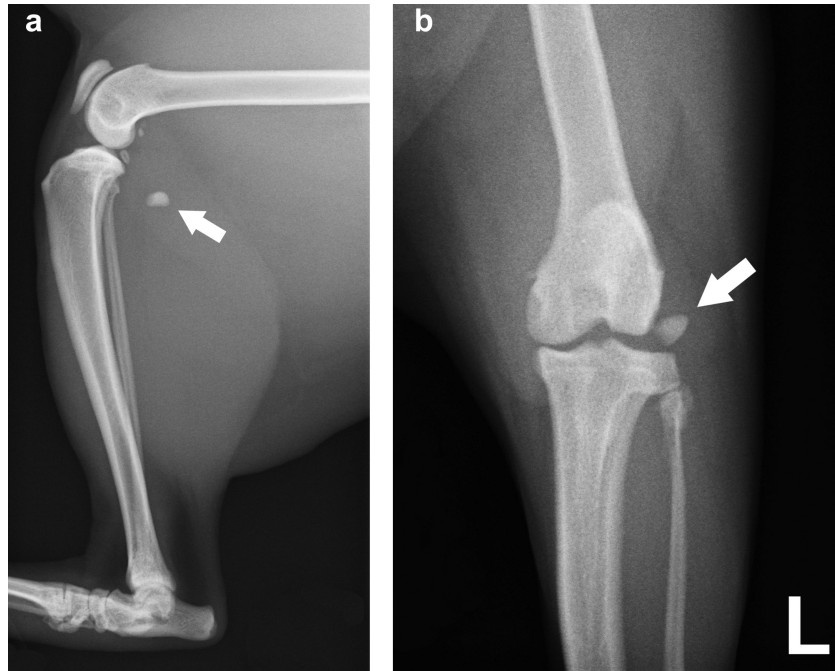


Fig 1. (a and b) Preoperative radiographs of the left stifle, with the hock in flexion, demonstrating a distal displacement of the lateral fabella (white arrow).

Monofilament, SMI). The skin incision was closed with polyamide sutures (4-0 USP Trulon, Sutures India). In order to neutralise forces on the gastrocnemius muscle, the hock joint was maintained in extension with a calcaneotibial positional screw. A lateral approach to the calcaneus was performed and the tendon of the common superficial flexor freed. The hock was held in extension and a hole (2.0 mm) drilled through calcaneus and distal tibia. Both holes were taped and a 30 mm \times 2.7 mm cortical screw was inserted to function as a calcaneotibial positional screw. The individual muscle bellies as well as the subcutaneous tissues were reapposed in a routine fashion, using polydioxanone absorbable suture material (4-0 USP Surgicryl Monofilament, SMI). The skin incision was closed with polyamide sutures (4-0 USP Trulon; Sutures India).

Postoperative radiographs (Fig 2a and b) confirmed a satisfactory reduction of the lateral fabella. The immobilised tarsocrural joint was locked in an angle of 135°. A modified Robert Jones padded bandage, reinforced with a lateral splint, was applied to the limb. The cat was discharged the following day with instructions for strict rest and a dietary regime. Meloxicam (0.01 mg/kg PO q 24 h) was administered as postoperative analgesia. The stitches were removed after 12 days and the surgical wounds were checked at least once weekly. No postoperative complications were encountered. Five weeks after surgery the calcaneotibial screw was removed and a modified Robert Jones padded bandage, reinforced with a lateral splint, was applied for another 2 weeks before the cat resumed a gradual return to normal activity. Six months after surgery the cat had both a normal stance and gait.

Avulsion of the lateral head of the gastrocnemius muscle is a rarely reported cause of lameness in dogs, which has not yet been reported in the cat.^{1–5} Injuries to the gastrocnemius muscle can occur at the origin of the lateral or medial heads, in the muscle belly, at the musculotendinous junction and in the region of the tendon insertion to the calcaneus. Injury to the distal and middle regions is most common, whereas the proximal region is only rarely affected.⁶ A few reports have described avulsions of the medial^{6,7} and lateral heads,^{1–5} as well as a bilateral avulsion of the origin of the gastrocnemius muscle in dogs.⁸ Several reports have described a proximal gastrocnemius pathology without apparent displacement of the fabella.^{9,10}

The lateral head of the gastrocnemius muscle arises on the lateral, caudal tuberosity of the femur and a sesamoid bone, the fabella, lies in its tendon of origin. In most reported cases the avulsion of the lateral head of the gastrocnemius muscle has been associated with an acute trauma and an immediate plantigrade stance.^{1–3,5} One report described a sudden onset lameness with plantigrade stance 1 month after a traumatic incident.⁴ Although not directly observed, a traumatic cause seems most likely in our case as well, based on surgical findings and the unilateral pathology.

Surgical treatment was performed in most reported cases and included retaining the fabella with orthopaedic wire,^{2,5} 3.5 mm cortical screw and washer,³ sutures and carbon fibre augmentation,¹ as well as bone tunnels and Bunnel–Mayo tendon sutures.⁴ In two cases the hock was kept in extension to protect the gastrocnemius muscle avulsion repair, whereas all the other reports obtained successful outcomes with modified

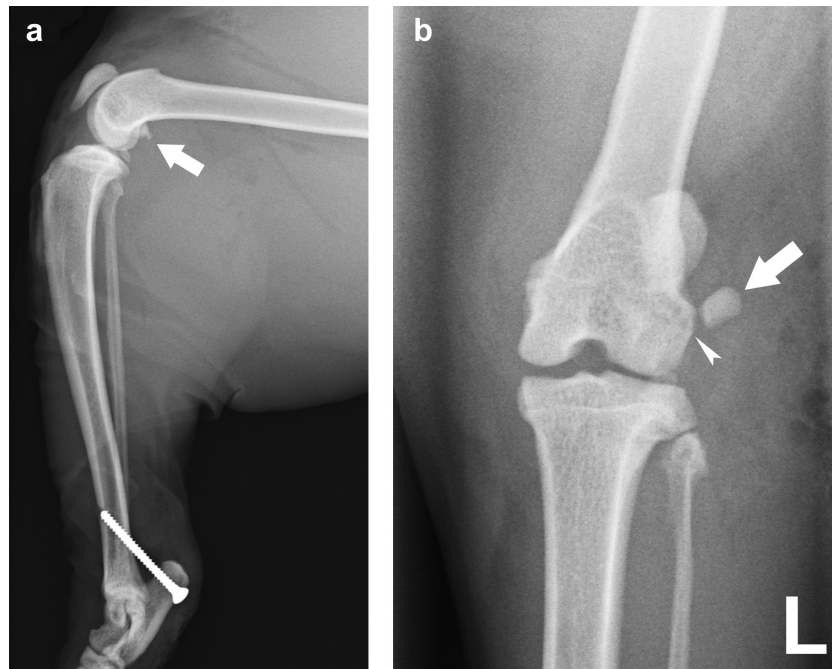


Fig 2. (a and b) Postoperative radiographs of the left stifle, with the hook fixed in extension (135°) by a calcaneotibial positional screw, showing the position of the lateral fabella after surgical fixation (white arrow). The location of the bone tunnel is indicated (arrowhead).

Robert Jones bandages for postoperative support only. Conservative treatment with physical therapy and therapeutic ultrasound has been described in dogs with proximal gastrocnemius pathologies, but seemed to be more successful in cases with a minimally or non-displaced fabella.^{6,9,10} We decided on a surgical treatment as the fabella was markedly displaced in our cat and the initial conservative treatment had not been successful. Owing to our patient's small body size, larger implants such as a cortical screw and washer were not feasible and bone tunnels with a modified locking loop suture pattern were employed. Because of the cat's obesity and its disobedient nature, we decided to use an additional calcaneotibial positional screw to protect our repair. Physical therapy as well as therapeutic ultrasound might have been beneficial, but would have been difficult to administer due to the animal's nature. The cat made a full recovery.

To the author's knowledge this is the first reported case of an avulsion of the lateral head of the gastrocnemius muscle in a cat.

References

1. Vaughan LC. Muscle and tendon injuries in dogs. *J Small Anim Pract* 1979; **20**: 711–36.
2. Reinke JD, Kus SP, Owens JM. Traumatic avulsion of the lateral head of the gastrocnemius and superficial digital flexor muscles in a dog. *J Am Anim Hosp Assoc* 1982; **25**: 213–6.
3. Prior JE. Avulsion of the lateral head of the gastrocnemius muscle in a working dog. *Vet Rec* 1994; **134**: 382–3.
4. Ridge PA, Owen MR. Unusual presentation of avulsion of the lateral head of the gastrocnemius muscle in a dog. *J Small Anim Pract* 2005; **46**: 196–8.
5. Ting D, Petersen SW, Mazzaferro EM, Worth LT. Avulsion of the origin of the gastrocnemius muscle. *J Am Vet Med Assoc* 2006; **228**: 1497–8.
6. Muir P, Dueland RT. Avulsion of the origin of the medial head of the gastrocnemius muscle in a dog. *Vet Rec* 1994; **135**: 359–60.
7. Chaffee VW, Knecht CD. Avulsion of the medial head of the gastrocnemius in the dog. *Vet Med Small Anim Clin* 1975; **70**: 929–31.
8. Robinson A. A traumatic bilateral avulsion of the origins of the gastrocnemius muscle. *J Small Anim Pract* 1999; **40**: 498–500.
9. Mueller MC, Gradner G, Hittmair KM, Dupre G, Bockstaller BA. Conservative treatment of partial gastrocnemius muscle avulsions in dogs using therapeutic ultrasound – a force plate study. *Vet Comp Orthop Traumatol* 2009; **22**: 243–8.
10. Stahl C, Wacker C, Weber U, et al. MRI features of gastrocnemius musculotendinopathy in herding dogs. *Vet Radiol Ultrasound* 2010; **51**: 380–5.