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Rupture of the peroneus tertius muscle in a five-year-old Argentine mare: A case report

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Abstract

The third peroneal muscle (musculus peroneus tertius or musculus fibularis tertius) in horses is entirely tendinous and plays a crucial role in the reciprocal apparatus, which synchronizes the flexion and extension of the stifle and hock joints. Rupture of this muscle presents with distinctive clinical signs, most notably the inability of the hock to flex during forward movement of the pelvic limb. Additionally, passive limb flexion reveals independent movement of the hock and stifle, which is abnormal. Trauma is the most common cause of this injury, with ruptures occurring at various sites, including the mid-body of the muscle, its insertion or its origin. Imaging techniques such as ultrasonography and radiography are essential for accurately identifying the rupture site. The prognosis varies depending on the severity and location of the rupture. The present case report detailed the aetiology, diagnostic approach and treatment of third peroneal muscle rupture in a five-year-old Argentine mare. The mare presented with reluctance to walk and trembling of the right hind limb, a day after exercise. Diagnosis of rupture of the peroneus tertius muscle was made based on physical examination, radiography and ultrasonography. The case was managed by giving the mare stall rest for two months, application of anti-inflammatory agents and supportive vitamin therapy. The mare recovered and was re-introduced to exercise after stall rest.

Keywords: Third peroneal muscle; Rupture; Horse (Equine); Lameness; Hock joint.

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Introduction

The peroneus tertius muscle, a critical component of the reciprocal apparatus in equine locomotion, plays a vital role in coordinating the simultaneous movement of the stifle and hock joints (Fails, 2020). Rupture of this muscle, though relatively uncommon, leads to characteristic gait abnormalities, including the inability to flex the hock while the stifle is flexed, resulting in an abnormal extension of the hind limb during locomotion (Turner and Anderson, 2020). This condition is typically caused by excessive force or over-extension of the hind limb during intense physical activity, slipping or accidental trauma (Dyson and Genovese, 2011).

In horses, the third peroneal muscle (m. peroneus tertius or m. fibularistertius) is primarily tendinous, with minimal muscular characteristics. It is situated on the extensor surface of the crus, where it overlaps the cranial tibial muscle and is covered by the belly of the long digital extensor muscle. This muscle originates from the extensor fossa of the femur and inserts on the dorsal surface of the tarsus and the proximal end of the metatarsus (Dyce *et al.,* 1996).

The third peroneal muscle, together with the common calcaneal tendon, is integral to the equine pelvic limb stay apparatus, facilitating a functional link between the stifle and tarsal (hock) joints. In horses, stifle flexion is inherently associated with hock flexion. Under normal conditions, the extension of one joint results in the concurrent extension of the other. However, when the third peroneal muscle tendon is ruptured, the functional synchronization between the two joints is disrupted, enabling hock extension while the stifle remains flexed (Koenig *et al.,* 2002; 2005).

Diagnosis of peroneus tertius rupture is primarily based on clinical examination, with hallmark signs such as the ability to extend the hock while the stifle remains flexed, a loss of the normal reciprocal mechanism, and palpable swelling or discontinuity in the muscle body or tendon (Reed *et al.,* 2020). Ultrasonography and radiographic imaging further aid in confirming the extent of the injury and ruling out concurrent musculoskeletal damage (Whitcomb, 2016).

Treatment of peroneus tertius rupture is largely conservative, involving prolonged stall rest, controlled exercise and anti-inflammatory therapy, to allow for gradual fibrous tissue repair and restoration of function (Ross and Dyson, 2010). Prognosis varies depending on the severity of the rupture and the effectiveness of rehabilitation protocols, with many cases regaining satisfactory function for low- to moderate-intensity activities (Tnibar, 2003).

The present case report described a rare occurrence of peroneus tertius muscle rupture in a five-year-old Argentine mare, detailing the clinical presentation, diagnostic approach, treatment strategy and outcome. By documenting this case, we aim to contribute to the existing knowledge on the diagnosis and management of peroneus tertius injuries in equine practice.

Case Presentation

A five-year-old Argentine mare weighing 450 kg with a body condition score of 4 (on a scale of 5) was presented to the Veterinary Teaching Hospital, University of Maiduguri, Nigeria, on the 20th of June 2023 with the following complaints: reluctance to walk and trembling of the right hind limb. The condition was reportedly observed in the morning on the day of presentation, following exercise the previous evening. The mare was imported from Argentina nine days prior to presentation. The mare had been dewormed and vaccinated against African Horse Sickness. Diminazene aceturate had also been administered prior to presentation.

A general physical examination revealed that the patient was in good overall body condition, with no visible skin lesions such as wounds or abrasions. A focused assessment of the musculoskeletal system at rest indicated normal posture and even weight distribution across all limbs. However, a noticeable soft tissue enlargement was observed on the cranial side of the mid-section of the zeugopodium (crus) in the left pelvic limb. During movement, the horse exhibited distinct swinging-leg lameness in the affected limb. The hoof-lifting motion was compromised, causing the dorsal surface of the hoof's keratinous wall to make contact with the ground while walking. Additionally, there was a pronounced extension of the tarsocrural joint, with the crus aligning almost in a straight line with the metatarsus while the stifle joint remained flexed (Figure 1)

Vital parameters (temperature, pulse rate and respiratory rate) were measured and recorded (Table 1). The temperature, pulse and respiratory rate of the mare were within the normal/reference range for horses (Table 1). A radiograph (Figure 2) and an ultrasound scan (Figure 3) of the right gaskin were also taken. The radiograph image apparently appeared normal but was instrumental in ruling out fractures or avulsion injuries, and was not used to confirm the rupture itself. Soft tissue swelling characterized by increased soft tissue opacity over the cranial tibia/craniolateral stifle-hock region was observed. Increased cross-sectional area of the soft tissue characterized by hypoechoic swelling, hemorrhage, pain on probe pressure were additional evidences used in confirming the case.

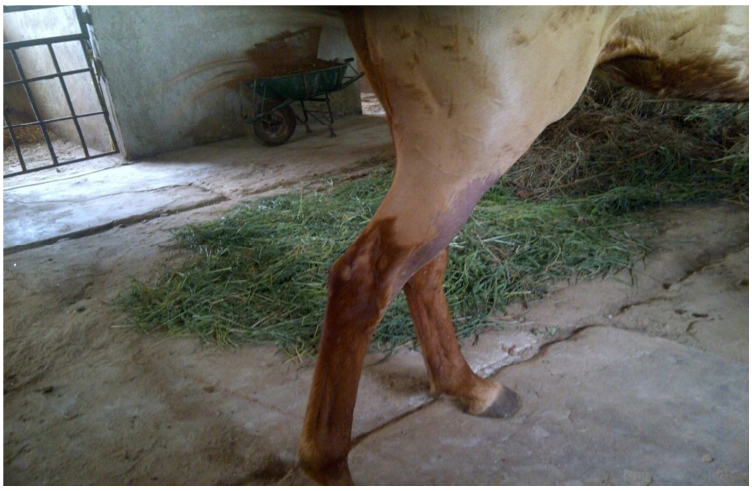

Figure 1. Extension of the tarsocrural joint in the mare, characteristic of the third peroneal muscle rupture.

Table 1. Vital parameters (temperature, pulse rate and respiratory rate) of the mare that presented with rupture of the peroneus tertius muscle.

Parameters	Patient's value	Normal (Reference) value*
Temperature (°C)	37.7	37.2 – 38.8
Pulse rate (beats/minute)	32	28 – 40
Respiratory rate (cycle/minute)	12	10 – 14

*** Source:** Khelifi *et al*. (2017).

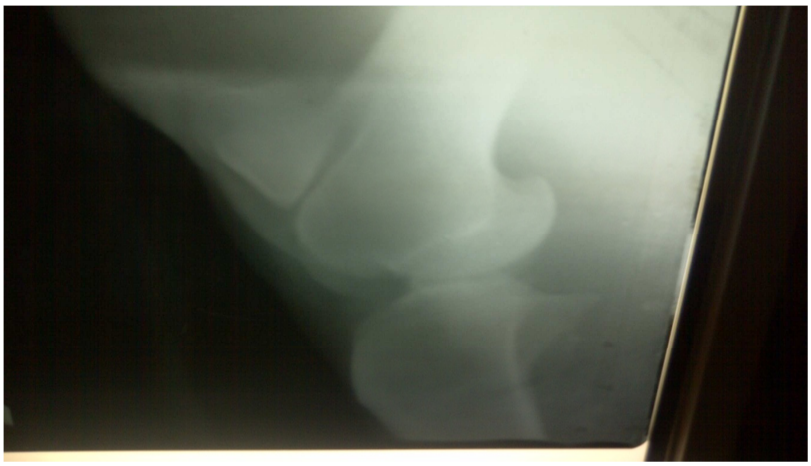

Figure 2. Radiograph of the right gaskin of the mare that presented with rupture of the peroneus tertius muscle.

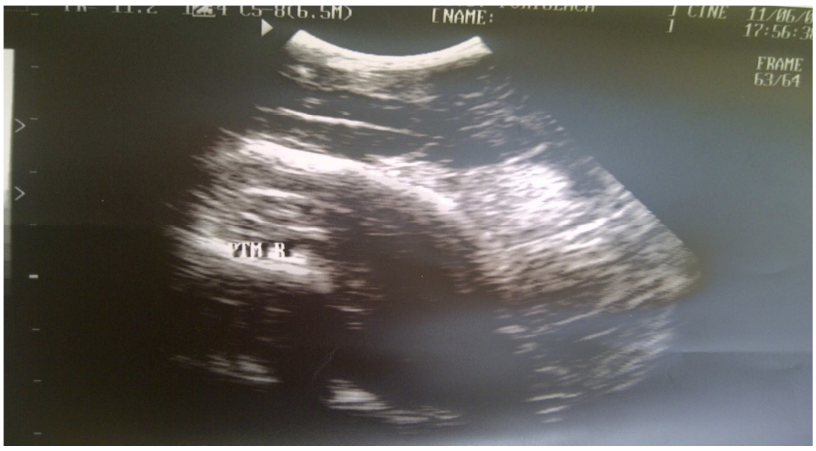

Figure 3. Ultrasound scan result of right gaskin of the mare that presented with rupture of the peroneus tertius muscle.

Diagnosis and Treatment/Management

A diagnosis of an injury to the third peroneal muscle of the left pelvic limb was confirmed based on the clinical observations, radiography and ultrasonography results.

Two months of complete stall rest was prescribed. During the first week post-injury, a topical gel containing heparinoid (Hirudoid gel®, Mobilat Produktions GmbH, Pfaffenhofen, Germany) was applied to the affected area as an anti-thrombotic and anti-inflammatory agent. Additionally, the non-steroidal anti-inflammatory drug (NSAID) flunixin (Flunimeg®, Norbrook Laboratories Ltd., Newry County Down, Northern Ireland, UK) was administered intravenously once daily for three days at a dose of 1.1 mg/kg body weight.

Supportive therapy included Vitamin B_6, Vitamin B_{15} and Orphenadrine Aspartate supplement (Batacas ®, Chinfield, Argentina), administered intramuscularly at 10 ml every 48 hours for six weeks, along with Vitamin C supplement (Ascorbic Acid, Disodium Edetate, Methyl Parahydroxybenzoate, Propyl parahydroxybenzoate, and Sodium sulphite) given intramuscularly at 50 ml once a week for

four weeks. After the first week, heating ointments were introduced as part of the treatment regimen.

Follow-up evaluations conducted at one and two months post-injury indicated a reduction in lameness. However, an ultrasound examination performed one month after the injury showed no significant improvement in the affected muscle.

Discussion

Rupture of the third peroneal muscle is an uncommon injury in horses (Dzierzęcka*et al.,* 2006; Thorpe *et al.,* 2010). A rupture of the third peroneal muscle can easily be confused with fractures of the femur and crural bones, as these injuries can also lead to limb dragging, a symptom associated with third peroneal muscle rupture (Bertoni *et al.,* 2013). In cases of rupture, this symptom arises due to dysfunction of the tarso-crural joint flexors and increased activity of their antagonistic muscles, namely the hock joint extensors (Kester, 1991). A distinct clinical presentation of concurrent stifle flexion and hock extension was noted in the present case. The most frequent cause of the injury may have been blunt force trauma without laceration.

Diagnostic imaging using ultrasonography and radiography identified the rupture site: the rupture occurred in the mid-body of the tendon. Ruptures occurring at the origin may commonly be accompanied by avulsion fractures of the lateral femoral condyle, which may also lead to long digital extensor muscle rupture (Koenig *et al.,* 2005). It has been reported that the location of the rupture does not affect the horses' ability to return to exercise (Koenig *et al.,* 2005).

Findings in the present case showed that the sign of a third peroneal muscle rupture in this horse was more apparent during motion than at rest, as the affected limb supported weight normally when stationary. Similar to other reports, the common calcaneal tendon was found to be visibly loosened and exhibited characteristic dimpling (Blikslager and Bristol, 1994; Koenig *et al.,* 2002; Koenig *et al.,* 2005).

Observations from both personal studies and existing literature indicate that horses diagnosed with a rupture of the third peroneal muscle require a significant reduction in physical activity (Tatarniuk *et al.,* 2020). The most effective approach involves at least 2 – 3 months of stall rest, followed by a gradual reintroduction of exercise, which has been supported by both personal observations and reports from other researchers (Trout and Lohse, 1981).

Horses with this condition require consistent orthopedic evaluations, including ultrasound monitoring (Leveille *et al.,* 1993). During the recovery period, these follow-up assessments should be conducted at least once a month. Ultrasound imaging typically reveals fibrous tissue formation at the site of the injury. In the first week following the injury, the application of topical agents with anti-thrombotic, anti-inflammatory and anti-oedematous properties, along with systemic anti-inflammatory medications, was beneficial, as recorded in the present case. Subsequently, after approximately one week, the use of healing ointments proved effective.

In this case, as well as in most horses with third peroneal muscle rupture, significant scar tissue development has been reported to occur within 60 – 90 days post-injury, depending on the severity of the damage (Koenig *et al.,* 2005). However, it has been reported that around 20% of horses with this type of tendon rupture may experience limited recovery due to the extent of the injury, resulting in persistent lameness (Koenig *et al.,* 2005)

Conflict of interest

The authors declare no conflict of interest.

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